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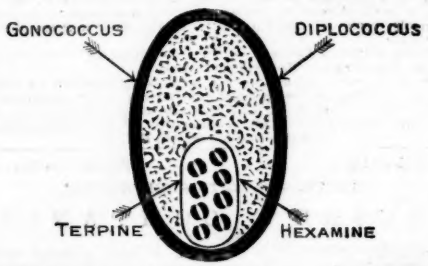

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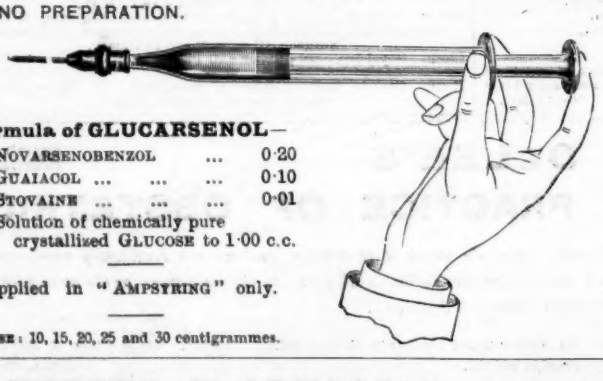

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ON

BACTERIAL INTOXICATION.

Delivered before the Royal College of Physicians of London.

BY F. H. TEALE, B.Sc., M.D. LOND., F.R.C.P. LOND.,

LECTURER ON BACTERIOLOGY, UNIVERSITY COLLEGE HOSPITAL MEDICAL SCHOOL, AND HONORARY MEDICAL OFFICER IN CHARGE OF THE VACCINE DEPARTMENT, UNIVERSITY COLLEGE HOSPITAL.

MR. PRESIDENT AND GENTLEMEN,—In this lecture I propose to deal with some recent experiments on bacterial intoxication, dividing my observations into two parts: I. Those dealing with the bacteria themselves. II. Those dealing with the infected animals.

I. OBSERVATIONS ON THE BACTERIA THEMSELVES.

(a) "*Washed Spores*" *and Latency of Infection and Intoxication.*

It has become an accepted fact in text-books that the spores of bacteria carefully freed from their toxin do not germinate when inoculated into a susceptible animal. Their fate is variously described according to the result to be explained. Thus it is found that lactic acid inoculated simultaneously with the washed spores causes infection to take place with typical intoxication. This is explained by saying that lactic acid prevents phagocytosis of the spores, and thus their destruction is inhibited and germination followed by toxin formation is allowed to occur. Again, the injection of lactic acid, quinine, &c., may cause infection and toxin formation to occur days and even weeks after the inoculation of the spores. Here the idea is that the spores have remained latent either at the seat of inoculation or in the other tissues, and that the lactic acid by causing destruction of tissue produces a suitable medium for the germination of the spores.

The original work on the persistence of the washed spore in its latent state after inoculation was published by Tarozzi and confirmed and extended by Carforna. Their work, however, is valueless from the point of view of latency of the spore, because nowhere in their experiments has any attempt been made to differentiate between germinated forms and spores. It was taken for granted that the growths developing from the culture of the infected tissues must be from latent spores. Koser and McClelland subsequently investigated the same subject, but did not really determine if any of the spores became vegetative forms. They only showed that the washed spores of aerobic organisms rapidly disappeared both from the seat of inoculation and the internal organs, and that the washed spores of the obligatory anaerobes survived for some time. They made no effort to ascertain if in the case of the aerobic bacteria the disappearance of the spores could be accounted for by their germination into vegetative forms, and if the same did not occur to a lesser extent with those from the obligatory anaerobes.

Dr. E. Bach and myself investigated this problem some time ago with a view of studying the reason of the latency of the symptoms of intoxication following injection of these washed spores.

We experimented with carefully washed spores obtained by subjecting well-spored cultures to 80° C. moist heat for three hours. These spores from both types of organisms were inoculated by various routes into susceptible animals, and at intervals the organs of these animals were taken sterilely, emulsified, and cultures made from these emulsions: (*a*) From the emulsions direct, to obtain the total number of bacteria present either as spores, vegetative forms, or both. (*b*) After heating the emulsion to 80° C. for 30 minutes, to obtain the number of spores present, and by comparison with the results of (*a*) to get the number of vegetative forms. In addition the washed spores were inoculated intravenously into rabbits and the rate of disappearance from the peripheral circulation noted. Thus, a rabbit of 2020 g. was inoculated in the vein of one ear with ½ c.cm. of a very thick emulsion of washed anthrax spores. Cultures were made from the blood from the opposite ear vein at intervals, and the result was as follows.

Directly after inoculation there were			50,000	spores per c.cm.	
5 minutes	,,	,,	10,000	,,	,,
10 ,,	,,	,,	2,000	,,	,,
15 ,,	,,	,,	800	,,	,,
30 ,,	,,	,,	800	,,	,,
60 ,,	,,	,,	400	,,	,,
2 hours	,,	,,	100	,,	,,
3 ,,	,,	,,	nil	,,	,,
5 ,,	,,	,,	nil	,,	,,

Experiments performed on guinea-pigs inoculated with washed spores and killed at different intervals show that the removal of the spores from the peripheral circulation is due to phagocytosis occurring especially in the capillaries of the liver, spleen, and lungs. The mechanism is that the spores, like the vegetative forms of bacteria, act as foreign bodies, cause a process of beginning clot formation in the capillaries of the above-mentioned organs, and get entangled in the small masses of clot thus produced. The leucocytes are attracted to these masses of bacteria-containing clots and the bacteria become phagocyted. Intraperitoneal injection shows a similar process of phagocytosis by the endothelial cells of the omentum, and later by the polymorphonuclear leucocytes, just as for vegetative bacteria. With subcutaneous inoculation numbers of spores are phagocyted, but a relatively large number remain free for a long time. This is not peculiar to the spores; ordinary vegetative bacteria are found to remain free for quite long periods in the subcutaneous tissues.

These results show that the washed spores on injection into an animal are treated just like ordinary vegetative forms of bacteria, as regards phagocytosis, &c. The following experiments will show what happens later to the injected spores.

Experimental Results.

1. Constant amounts of carefully washed spores of *B. anthracis* were inoculated intravenously into a series of guinea-pigs. The animals were kept alive for various periods and emulsions were made from the spleen and plated.

	Emulsion unheated.	Emulsion heated to 80° C. for 30 minutes = latent spores.
1 day after inoculation	1,200,000	..... Nil.
2 days ,, ,, ...	800,000	..... ,,
3 ,, ,, ,, ...	350,000	..... ,,
5 ,, ,, ,, ...	80,000	..... ,,
7 ,, ,, ,, ...	10,000	..... ,,
14 ,, ,, ,, ...	7,000	..... ,,

2. *B. œdematis maligni*, washed spores, also inoculated intravenously into guinea-pigs, spleens plated.

	Emulsion unheated.	Emulsion heated to 80° C. for 30 minutes.
1 day after inoculation	860,000	 24,000
2 days ,, ,, ...	180,000	 2,600
4 ,, ,, ,, ...	80,000	 1,400
10 ,, ,, ,, ...	2,000	 20

These experiments show that the spores of aerobic and obligatory anaerobic bacteria germinate when inoculated into a susceptible animal, and this in spite of the phagocytosis which goes on directly after their inoculation. The spores of the aerobic organisms germinate more completely and rapidly than those of the anaerobes; also the spores appear to persist in the subcutaneous tissues at the seat of inoculation longer than in the internal organs. The question then arises as to what happens: the phagocyted spores apparently are not all killed, a large number germinate. Sections made from the internal organs of an animal inoculated some days previously with washed spores show that there are free vegetative forms in large numbers in the capillaries, of the liver, &c., not in the wandering nor apparently in the endothelial phagocytes. Smears made from the peritoneal cavity and omentum two days after the inoculation of washed spores of *B. anthracis* show 90 per cent. spores phagocyted, 10 per cent. free, 70 per cent. bacteria are free, 30 per cent. phagocyted; and five days after inoculation show that 97 per cent. of the spores are phagocyted and 3 per cent. free, and that of the vegetative forms 60 per cent. are phagocyted and 40 per cent. free. The spores form 60 per cent. of the total forms, the vegetative 40 per cent.

The examinations of the smears from the peritoneum after inoculation into that cavity, taken in conjunction with the cultural counts, show that a large number of the spores have been killed. Hence we must come to the conclusion that when washed spores are inoculated into a susceptible animal large numbers are destroyed, but quite large numbers germinate and these forms become only slowly phagocyted and destroyed, and that in spite of the presence of large numbers of these germinated vegetative forms in the animal it exhibits no signs of poisoning. The germinated vegetative forms are incapable of provoking intoxication.

These experiments further show that the germinated forms do not appear to multiply but become relatively slowly destroyed. Hence they must be able to derive sufficient food from the infected host to enable them to survive for some time, and, on the other hand, to be so little irritative or foreign that they are not rapidly phagocyted or destroyed in the plasma or phagocyte. It becomes evident, therefore, that these vegetative forms from washed spores (1) do not secrete a toxic substance (tetanus bacillus, *B. welchii*), or (2) are so slowly disintegrated that any possible preformed endotoxin is liberated in such small quantities at a time that it has no apparent effect on the infected animal. It cannot be argued that the washed spores have been so affected by the preliminary treatment that they give rise to avirulent vegetative forms, which only become virulent as the result of future accidents—e.g., injection of lactic acid, &c. This can be shown not to be the case, since if inoculated intraperitoneally with some 30 per cent. gelatine or sterile blood charcoal, typical infection occurs with these spores.

It has long been known that simultaneous inoculation of lactic acid, quinine, other organisms or trauma will cause fatal infection to occur from these washed spores. The injection or trauma need not be simultaneous with the spore inoculation, they may occur days after.

Influence of Secondary Factors in Toxicity.

The question is, how do these secondary factors affect the toxicity of the vegetative forms arising from the washed spores? Metchnikoff stated that lactic acid acted as a negative chemiotactic agent, and that when inoculated with the washed spores it inhibited their phagocytosis and hence their destruction, and thus allowed germination to occur with fatally resulting infection. He adduced as further proof of this the experiment of placing the washed spores in bags of filter paper, and introducing these into the tissues. He argued that the filter-paper capsule prevented the phagocytes from getting into contact with the spores, so germination was not impeded and the vegetative forms thus produced caused infection in the ordinary way.

Our experiments, however, completely negative these suggestions. In the first place, lactic acid does not act as a negative chemiotactic agent (at any rate in the early stages of phagocytosis); and, secondly, the injection of lactic acid will produce the same result when made days after the spore inoculation. In this case it cannot be claimed that the lactic acid interferes with an already accomplished phagocytosis. Further, a fatal result may be produced by the simultaneous inoculation of sterile blood charcoal with the spores—here there can be no question of the charcoal interfering with phagocytosis.

How, then, does the lactic acid act? It does not interfere with phagocytosis in the early stages, and later, even if it did, this factor alone would not alter the condition of things, since the germinated forms are largely free, as seen from the microscopic evidence already adduced. Lactic acid when injected will cause the lowering of the antitryptic titre of the plasma, and 0·5 c.cm. of N/1 lactic acid inoculated into a guinea-pig of 250–300 g. ought to produce a considerable fall, since 5 c.cm. N/1 lactic acid inoculated intravenously causes the antitryptic titre in a rabbit of 2000 g. to fall to 30 per cent. It is known that 0·5 c.cm. of N/1 lactic acid usually provokes a fatal result in guinea-pigs previously inoculated with washed spores. It might be thought that the destruction of antitrypsin by the lactic acid allows of autolytic digestion of the blood plasma, so that the bacteria would find a sufficiency of easily assimilable food and so start multiplying vigorously, and thus bring about a fatal issue. At first sight this might be supposed to be the explanation, since the intraperitoneal injection of gelatine into an animal inoculated shortly before with washed spores will produce a like result, the gelatine acting as the suitable nutrient medium in vivo. On closer and further examination this cannot be maintained, since subsequent injection of peptone does not produce a like result, and, more important still, the lactic acid does not produce a multiplication of the bacteria. In the case of the experiment with the washed spores of *B. anthracis*, the subsequent injection of lactic acid will produce a fatal result 14–21 days after the inoculation of the spores, but the post-mortem appearances are not at all typical of anthrax infection; the spleen is small and pale, the blood and the various tissues are not crowded with bacilli; in fact, the tissues appear microscopically free from the anthrax bacillus, and culturally the blood and tissues give no greater growths than controls which had no lactic acid. Then, again, lactic acid may act by causing damage to the tissues at the seat of its inoculation and autolytic degradation of the affected tissue; forming a nidus for the further development of bacteria locally and supplying digestive products for the others. As far as local damage is concerned, the injection of Gram's solution of iodine does not produce a fatal result in these cases, although in some cases the mere production of a wound or stirring up a wound will produce a lighting up in the human subject—but here it is not damage far away from, but at the seat of original infection, and the direct influence of mechanical irritation, &c., on the bacteria must be taken into account. Lactic acid might also conceivably act in a general way in the tissues, lowering their resistance and so allowing the bacteria to multiply and produce toxic substances. The injection of lactic acid diminishes the buffer salts, and so may hinder the removal of CO_2 from the tissues, but against this mode of action is the fact that sodium carbonate can cause a fatal result in animals inoculated with washed spores. These conjectures are, on the whole, very unsatisfactory—the best explanation is that the action of the chemical, drug, &c., is a direct one on both the tissues and bacteria, altering the existing mutual equilibrium of the environment of the one to the other.

Habituation to Environment of Bacteria Born in Captivity.

It would appear from the experimental evidence that bacteria born in the tissues from washed spores have become habituated to their environment, are able to carry on their vital functions, except multiplication, and do not act as irritants to the tissue, and consequently only become slowly phagocyted and destroyed. The injection of acids, alkalies, drugs, &c., affects the relative condition of habituation—the balance is disturbed and, as we shall presently see, interactions take place, producing toxic substances. In the case of the tetanus bacillus this alteration leads to the secretion of the exotoxin.

These observations show that: (i.) Washed spores do not all remain "latent." (ii.) The germinated forms do not give rise to the formation of toxic substances, this being due to either (*a*) the slow liberation of the toxalbumin because of the slow disintegration; (*b*) the habituation of these germinated forms to the physical conditions of the tissues and vice versa, disturbance of this leading to interaction, alteration of surface tension, &c., and toxin formation.

(*b*) *Evidence from the Treatment of Bacterial Protein in Various Ways.*

These may be summarised as follows:—

1. The intimate disintegration of the bacterial protein by grinding alone or grinding at very low temperature. These methods produce a very finely divided bacterial substance, which, as the result of the division, has become correspondingly increasedly toxic. This increase in toxicity is only carried to a certain degree; the so-called endotoxin thus produced never causes a sudden death, such as would occur with greatly increased doses of the alkaloids—e.g., strychnine, there is always a latent period of several hours. Then, again, the endotoxins obtained in this way from the different bacteria have no distinctive characteristic such as one would expect if there were specific endotoxins in the different varieties of bacteria; they all give rise to signs of intense poisoning without any characteristic symptoms. This method of pulverisation may be supposed to act in one or both of two ways. (1) Rendering available for immediate use and rapid action of a possible preformed toxalbumen or toxalbumose, which would be non-specific, simply that the albumin is primarily toxic; like protamine is among the ordinary animal proteins. (2) The fine state of pulverisation of the bacterial protoplasm exposes for a given amount of bacteria an infinitely greater surface for interaction with the antibodies in the tissues and tissue fluids, hence the interaction becomes more rapid, more intense, and a consequent greater and more rapid accumulation of the products of interaction occurs, which as we shall see later, probably produce the toxic effects.

2. *Maceration of the bacteria.*—Here the bacteria are allowed to undergo varying degrees of autolytic degradation and maceration, so that in addition to the greatly increased fineness of division of the bacterial protein, acting in the way already discussed, proteose bodies are also formed which produce the type of acute or delayed anaphylactic death. By carefully timing the duration of and hence the degree of maceration, &c., an acutely toxic suspension can be obtained, producing "anaphylactic" phenomena.

3. *Hydrolytic cleavage by alkalies, &c.*—Here the process is not the liberation of a preformed toxic substance, but the formation of hydrolytic cleavage bodies which can be acutely toxic. By none of these methods, therefore, can specific endotoxins be demonstrated.

II. Observations from the Symptomatology of Bacterial Infection of Animals.

The Post-mortem Appearances, the Toxicity, and Chemical Changes in the Tissues.

Vaughan and Wheeler, and Teale and Embleton independently drew attention to the uniformity of the symptoms of fatal bacterial infection in animals of the same species. In the main these can be summarised as follows:—

After the initial symptoms of invasion the signs of the intoxication are: 1. Gradually falling temperature, so that the animal dies with a temperature of 94° F. or less. 2. Gradually increasing paresis spreading from the posterior to the anterior extremities. 3. Convulsive seizures and respiratory disturbances. In rabbits these convulsive seizures are very marked, the animal getting laboured, then spasmodic respirations, then frequently a loud cry and a convulsive seizure, with rapid death. 4. Post mortem, right-sided distension, diminished coagulability of the blood, accumulation of blood fluids in the tissues, and in guinea-pigs distension of the lungs.

A. Vaughan and Wheeler thought that the antibodies in the tissues acted upon the bacterial protein and liberated by a process of cleavage a preformed toxic substance, and that although in the main the action of the toxic substance from different sources was very similar, there were some individual differences. Vaughan maintains that the toxic substances he obtains by treating various proteins with alcoholic potash are not products of hydrolysis of the protein, but are pre-existent and merely split off from combination with other protein constituents, these together forming a non-toxic combination. It is very peculiar that such drastic treatment as boiling with alcoholic potash should only split off this preformed toxic substance and cause such disintegration of the rest of the protein as to produce a large amount of ammonium.

B. Then Jobling, Petersen, and other workers were similarly impressed by the uniformity of the symptoms of bacterial poisoning in animals of the same species. These observers thought that the symptoms are all due to proteose poisoning, but that the proteose is not derived from the digestion of the bacteria by the antibodies and complement acting as a proteolytic ferment, but that the proteose is formed from the animal's plasma. The bacteria, according to this theory, produce proteose intoxication by causing the adsorption of the plasma antitrypsin. This adsorption allows the plasma proteolytic ferment to auto-digest the plasma, and thus form toxic proteoses. Their idea is therefore that bacterial intoxication is due to varying degrees of peptone poisoning from the infected host's own plasma, and so bears a close relation to anaphylaxis, which they also explain as the result of proteose poisoning due to an autolytic degradation of the plasma brought about by the antigen adsorbing the antitrypsin and thus activating the plasma ferments. They also explain the formation of anaphylotoxin from bacteria in vitro by a similar theory, and then appear to bring into line some peculiarities which have been very puzzling—viz., why anaphylotoxin can be produced by exposing serum to non-bacterial substances, such as starch, agar, &c. Here, again, the idea is that bacteria, starch, &c., cause adsorption of the serum antitrypsin—this allows auto-digestion of the serum to take place with consequent formation of toxic proteoses. According to these observers, the antitryptic power resides in the unsaturated lipoids of the serum, and removal of these by solvents or adsorbents allows the proteolytic ferments of the serum to become active.

Dr. Bach and I also investigated the question of the relation of antitrypsin to infection, anaphylaxis, &c., but our results unfortunately do not agree with those of Jobling and his co-workers. Our experiments show:—

(i.) That the antitryptic power of a serum does not reside in the unsaturated lipoids. All the fats can be completely removed by Cathcart's method without affecting the antitryptic power of the serum. Further, we have been able to show that the antitrypsin of egg albumin is protein in nature, having been able to isolate it in a fairly pure state. (ii.) That the antitrypsin of the serum is not adsorbed in vitro by bacteria or by indifferent substances like agar, starch, &c., either at 0° C. or 37° C. (iii.) That after exposure to agar, starch, or dead bacteria, a serum becomes intensely toxic without any alteration in the antitryptic titre of that serum and without any chemical evidence of auto-digestion or digestion of the bacteria. (All these experiments had to be carried out with hæmoglobin free serum and with absolute bacterial sterility. For the latter reason diffusion methods were not used.) (iv.) That a weak proteolytic autolytic ferment exists in the serum of the guinea-pig, and a weaker one in the rabbit and man. The ferment can be demonstrated after destruction of the antitrypsin by chloroform in the cold, subsequent complete removal of the reagent by evaporation in vacuo followed by incubation at 37° C. A serum thus treated does not cause acute anaphylactic death—i.e., proteose poisoning. Jobling claims to have produced an intensely toxic serum by removing the antitrypsin by chloroform at 37° C., incubating and removing the chloroform by centrifugalisation and filtration. This does not remove the chloroform, and the acute death following intravenous injection of the serum treated in this way is due to chloroform. Chloroform at 37° C. also destroys the proteolytic ferment.

These experiments carried out by Dr. Bach and myself show that the substances which provoke the formation of anaphylotoxin in vitro do not do so by adsorbing antitrypsin, hence auto-digestion of the serum in the sense of the formation of toxic proteoses from it cannot occur, and we have to look for another explanation of the toxicity of a serum which has been thus exposed. Jobling further claims that by the intravenous injection of agar, kaolin, colloidal silicic acid, acute anaphylactic death can be produced. The theory being that these substances cause adsorption in vivo of the plasma antitrypsin which is rapidly followed by auto-digestion of the plasma.

Anaphylaxis.

Various observers use the term anaphylaxis very loosely, and it is very much to be deprecated; it gives a completely erroneous view of true anaphylaxis. The term should not be used simply for sudden death with convulsions, &c. In a great many cases where death is simply due to intravascular clotting the symptoms are very much like those of anaphylaxis; to this class belong the experiments of Jobling with agar, &c. These cases should not be called anaphylactic; they can easily be distinguished by the fact that, apart from post-mortem appearances, the preceding or simultaneous injection of an anti-coagulant like leech extract prevents a fatal issue, but does not do so with true anaphylactic shock; examples of this are the sudden death from intravascular clotting after intravenous injection of agar, silicic acid, carmine, muscle extract, &c. This theory of Jobling's further postulates that anaphylaxis is a blood reaction, which we now have reason to believe it is not. Jobling and his co-workers have therefore failed to establish the main points of their theory. In connexion with this Dr. Bach and I investigated the changes in the blood, tissues, and effusions in infected and in sensitised animals.

(*a*) *Antitryptic Content of the Blood in Infection.*

As the result of the inoculation of any form of protein, whether bacterial or otherwise, there is an alteration in the antitryptic content of the blood. The variation is fairly uniform with all forms of infection. There is at first a negative phase, beginning soon after the inoculation and reaching its maximum about 2-4 hours after the infection; this is followed by a return to normal in from 8-24 hours, and the rise is continued so that the antitryptic titre may reach 150-200 per cent. of the original. This usually lasts for 2-3 days and is followed by a gradual return to normal. The question then arises as to the meaning of this fall in the antitryptic titre and its relationship to infection and intoxication. In the first place, the animal infected may die with the antitryptic titre in any phase—negative in the first 2-4 hours, rising up to 18-24 hours, and even high above normal, 150-200 per cent., two or three days after infection. Even when acute deaths occur in 2-4 hours the titre has only fallen about 20 per cent. in the majority of cases. On the other hand, we have observations where the animal has recovered with a low antitryptic titre. Taking it as a whole, the antitryptic titre at the time of death depends on the duration of the infection. At first sight it would appear that the antitrypsin had become adsorbed by the infecting material, and consequently autodigestion of the plasma and the production of toxic proteoses might have occurred. It must be noted that the fall in the antitryptic content is only small and the presence of the remaining 80 per cent. means that the serum is not only capable of inhibiting any proteolytic enzyme in the serum but also added trypsin; hence, unless we postulate great local reductions sufficient to allow autolysis to go on in these local areas, the loss of antitrypsin as a whole will not be sufficient to allow of autodegradation. The great objection to this antitrypsin loss accounting for bacterial intoxication by the possible production of proteoses by autodigestion of the plasma is given by the following experiment with lactic acid.

A rabbit of 2000 g. was inoculated intravenously with 5 c.cm. of N/1 lactic acid, and the antitryptic titre fell in 15 minutes to

66 per cent., in 30 minutes to 50 per cent., in 2 hours to 40 per cent., in 3 hours to 30 per cent., and remained so for 19 hours, then rose to normal in 30 hours after the inoculation. Here, in spite of the rapid and great fall of the antitryptic titre, the animal within 30 minutes of the injection was perfectly well and continued to be so. If, therefore, the destruction or adsorption of antitrypsin in vivo leads to a certain degree of autodigestion of the plasma, then with the lactic acid injection experiment, which almost completely destroys the antitryptic titre, a very violent proteose poisoning should occur, but there is absolutely no sign of poisoning in the remotest degree. Again, if the poisoning in infection were purely a proteose poisoning, resulting from autodigestion of the plasma following antitrypsin adsorption by the bacteria, it should follow that the rise in antitryptic titre to above normal should indicate a complete cessation of the activity of the autolytic ferment and a cessation of formation of toxic proteoses. If, however, it should still be held that the poisoning following bacterial infection is an autoproteose intoxication brought about as mentioned above, then with the rise in antitrypsin and cessation of poison formation there must be added another factor—viz., that the toxic proteoses may cause changes in the tissue cells, which continue after the proteose formation has ceased, and so lead to a fatal result. Again, there is also no difference in the type of antitryptic curve obtained in animals after injection with pathogenic or non-pathogenic bacteria, and therefore in both autodigestion of the host's blood plasma should occur equally. This is another argument against the theory of autodigestion intoxication in bacterial infection. The question, then, is what does the alteration in antitryptic content of the blood indicate? There seem to be two further possibilities to be considered. 1. That the fall in the early stages of infection is due to antitrypsin neutralising ferments liberated by the destruction of leucocytes. Against this, however, is the fact that the antitryptic titre rises as a fatal infection progresses. During this the liberation of leucocytic ferments due to continuing phagolysis ought to lead to a progressive diminution of the antitrypsin unless the initial loss is rapidly made up and ends by over-production. Another point against this is that the negative phase may be absent even with a fatal infection, on the one hand, and does occur when absolutely non-toxic substances, such as egg albumen or even cod-liver oil, are inoculated extraperitoneally. 2. That the antitrypsin influences tissue metabolism. This will be discussed later.

(*b*) *The Relationship of Antitryptic Titre to Anaphylaxis.*

I have already drawn attention to experiments which show that a highly toxic anaphylotoxin can be made without any evidence of antitryptic adsorption or autodigestion. I shall now state the results of our experiments in anaphylaxis.

In absolutely acute anaphylactic shock there is no loss of antitrypsin in the blood, in delayed shock there is a gradual loss, the loss varying directly with the prolongation of the symptoms leading to the death of the animal. In cases where there are severe symptoms followed by recovery the antitryptic curve is just like that during infection with bacteria. The fall in the subacute and delayed anaphylactic shocks may amount to 20 per cent., and is not much if at all greater than the fall due to the primary injection of the antigen in a normal animal. In acute anaphylactic shock, therefore, there can be no fulminating or rapid autodigestion of the serum, since there is no antitrypsin adsorption accompanying the combination of antigen with its specific antibody.

In the delayed shock the fall is not greater than with the primary antigen injection; hence, if the shock were solely due to proteose intoxication following antitrypsin absorption, it should be as great with the primary as with the second inoculation of antigen. Again, the experiments dealing with lactic acid injection must be borne in mind, here the fall in the antitryptic content is sudden and intense, yet there are no signs of acute proteose poisoning. It might be argued that the lactic acid destroys the ferment at the same time, and hence autodigestion does not occur. This is undoubtedly true in in vitro experiments, but, as Professor Baylis shows, there is no increase of H-ion concentration in the plasma even with the injection of such large amounts of acid as used in the experiment; hence the destruction of the ferment should not take place.

(*c*) *Chemical Changes: Non-Coagulable Nitrogen.*

Finally, Dr. Bach and I investigated the non-coagulable nitrogen in the blood during infection. During infection the animal takes no food, and in a normal animal during starvation the N.C.N. gradually falls. We have found that there is no demonstrable rise in non-coagulable nitrogen in the blood of the animal dying 1–4 hours after the infection, and none in acute or delayed anaphylactic shock, but as the period of infection is prolonged there is a corresponding increase in N.C.N. Dr. Bach and I have shown this is practically solely due to an accumulation of urea in the blood. There is very little evidence of the accumulation of amino-acid nitrogen in the blood during infection, and our methods are not delicate enough to demonstrate small quantities of proteoses. This increase in urea points to greatly increased tissue katabolism, and it appeared probable that the increase in antitrypsin might be accounted for as an effort to control this, to inhibit the intracellular proteolytic ferments. We accordingly performed experiments re the action of antitrypsin on tissue autolysis, and found that it had none, that serum only inhibited autolysis or slowed it down in so far as it diminished the amount of free acid available for the activation of the autolytic ferment. The activity of the autolytic ferment of the tissues is within limits proportional to the degree of acidity. Further, prepared antitrypsin from egg white had no influence on the autolytic ferments of fowls' organs.

Bacterial Poisoning the Result of Toxins Produced by Digestion of Bacteria.

C. The next point to be discussed is one which is older in date of conception—viz., the question of bacterial poisoning being due to digestion of the bacteria by the complement or complement and antibody, and according to the rate of accumulation of toxic proteoses from the digested bacteria symptoms occur. This conception was advanced some years ago by Dr. Embleton and myself. I want now to discuss this in the light of further knowledge and amend it. The idea of anaphylotoxin being the result of the proteolytic degradation of the antigen by means of its specific antibody and complement acting as the proteolytic enzyme is in the first place due to Friedberger. His work was apparently confirmed by Abderhalden in his demonstration of protective ferments. Now in all the methods used for demonstrating proteoses and digestive products in connexion with this work, Abderhalden and other workers did not carry out their experiments with absolute bacteriological sterility—and, in fact, with diffusion thimbles this is impossible. Dr. Bach and I carried out numerous experiments with scrupulous care with regard to bacteriological sterility to see if complement and specific antibody did act as a proteolytic enzyme on the homologous antigen; we were absolutely unable to find any trace of amino-acid nitrogen in these experiments, even when the experiment was carried on for days. Similarly we always got negative results with the Abderhalden test for pregnancy when carried out with complete bacteriological precautions. So from the direct chemical point of view we were unable to prove the proteolytic activity of complement and specific antibody.

There is, therefore, no direct proof in support of the theory that bacterial poisoning is due to the proteolytic degradation of the bacterial protein. There is only à priori evidence that proteoses can produce many of the symptoms of intoxication. Before discussing this matter further from this point of view, it will be advantageous to see if any evidence that toxic material can be demonstrated in the blood or effusions of animals dying from bacterial infection or anaphylaxis.

(1) With regard to the blood in infection. The great difficulty lies in the primary toxicity of the blood, especially if it has been whipped. Experimental evidence shows that the blood from an animal dying from bacterial infection is only slightly more toxic than that from a normal animal of the same species. The blood from animals dying from acute or delayed anaphylaxis is the same. The toxicity of the blood manifests itself on intravenous injection in the guinea-pig by causing the anaphylactic syndrome. (2) In effusions. There is no doubt that the effusions of animals dying from bacterial infection are highly toxic, so that doses of 2–3 c.cm. will cause acute anaphylactic death in normal guinea-pigs on intravenous inoculation. In these Dr. Bach and I have never been able to find any evidence of digestive products by methods other than diffusion methods.

The fact therefore emerges that "anaphylotoxin" can be demonstrated definitely in the effusions of infected animals, its demonstration in the blood is not so evident.

Is there any other evidence of "anaphylactic" phenomena occurring during infection? The symptoms already mentioned as being the prominent ones in the course of bacterial infection are very like those of delayed and protracted anaphylaxis—viz., the fall of temperature, fall of blood pressure, gradually increasing paresis, the respiratory troubles and convulsions, and post mortem the incoagulability of the blood and right-sided distension with pulmonary emphysema. Further, during the course of an infection by suddenly increasing the amount of bacterial protein an infected animal may be made to die quite acutely with typical acute anaphy-

lactic shock. Thus a rabbit infected with *B. coli* may, two to four hours after the infection, be killed quite acutely by the intravenous inoculation of one or two slopes of *B. coli*, the symptoms being rapidly increasing difficulty in breathing, sudden cry, convulsions, and death, with rapid fall of temperature and delayed coagulability of the blood. We have thus the evidence of (*a*) the presence of anaphylotoxin in the effusions; (*b*) the similarity between the symptoms of infective poisoning and anaphylaxis; (*c*) acute anaphylactic death may be brought about by further injection of antigen into an infected animal.

Relation of Antibody to Specific Antigen in the Causation of Symptoms of Intoxication.

Before the discussion of the possible nature of anaphylotoxin and anaphylaxis and their relation to toxicity and infection, the relationship of the antibody to the specific antigen in the causation of the symptoms of intoxication calls for examination.

This was discussed by Dr. Embleton and myself some years ago when we brought forward evidence from numerous experiments to show that the toxicity of a bacterium depends on the relative balance of its specific antibody to it. By altering their relationship the toxicity of a bacterium may be enhanced or diminished, and bacteria which previously were non-pathogenic may be made to cause infection, intoxication, and death. The amount of evidence bearing on this is fairly large. Thus, in addition to our own experiments there are those of Duval, who showed that living leprosy bacilli were not pathogenic to monkeys, but after sensitising monkeys with dead leprosy bacilli an inoculation with living bacilli was followed by typical infection and intoxication. Next is the experiment of Twort with the myco-bacterium bovis. This organism is absolutely non-pathogenic for the rabbit, but after a preliminary sensitising inoculation with dead bacteria a second one with the living bacteria produces typical infection and death. Similarly, take the pathogenicity of the human type of tubercle bacillus in the rabbit. As is well known, the human type is practically non-pathogenic for this animal, and the animal is used for differentiating by the pathogenicity test between the bovine and human types of bacilli. Dr. Embleton and I have shown that if rabbits are first inoculated with a dose of dead tubercle bacilli of the human type, after which they appear quite normal, have no fever or wasting, and then with a very small dose of living human bacilli, the rabbits will die of acute miliary tuberculosis. This has since been confirmed by experiments carried on by C. Austrian in the Johns Hopkins Hospital. Finally, there is our similar experiment with *B. mycoides*. The only drawback of this experiment is that occasionally by educating a cold growing *B. mycoides* to grow at 37° C. it becomes directly pathogenic, producing very rapid intoxication. But sometimes this is not the case, and the culture growing at 37° C. is not primarily pathogenic, but after sensitising a guinea-pig with dead bacteria of the same kind an inoculation of the living organism, which has proved to be innocuous in much larger doses, produces infection of the type *B. anthracis*. In addition to these experiments where the pathogenicity—i.e., the capability of an organism to produce infection and intoxication—is apparently brought about by increasing the antibody activity against it, there is another experiment which directly shows that an increased amount of antibody may directly increase the toxicity of a bacterium. Rabbits of the same size, weight, age, breed, &c., were inoculated (*a*) with a non-lethal dose of living or dead typhoid bacilli. Complete recovery occurred. (*b*) With the same dose of bacilli as in (*a*), but previously exposed to a high titre agglutinating serum, so that complete saturation had occurred. The injection of the sensitised bacilli caused death. In this experiment there can be no question of anything else but the increase in the antibody activity against the typhoid bacilli induced by the preliminary sensitisation of the bacteria; this increased amount of antibody has given rise to such an increased formation of poison from the same amount of bacteria that a fatal result has occurred. In the other experiments there is, in addition, the possibility of the preliminary inoculation producing a negative phase, and the probability that the further inoculation during this period of lessened resistance from diminution in antibody activity induces a summation of effects, and hence a fatal result.

Against the idea that the result of the above experiments are due to the production of a negative phase by the first injection and persisting to the time of the second one are:—

1. The supposed long duration of the negative phase in these experiments ten days. 2. That it is questionable if a negative phase ever occurs. Bull has lately not been able to demonstrate it after inoculating bacteria into animals possessing some degree of acquired immunity against them. Similarly the injection of red cells into an animal of another species is rapidly followed by the production of antibodies. 3. Experiments similar to the above do not give like results with other bacteria. Thus occasionally strains of *B. mycoides* are met with which are directly pathogenic in very small doses in a very short time—few hours. Now if a guinea-pig is inoculated with dead mycoides first and then later on, as in the above experiment, with living mycoides of the variety which is primarily pathogenic, the animal instead of dying, recovers. Here we have the animal recovering from a certainly fatal dose during a so-called negative phase. Hence we must conclude that the negative phase theory fails; that the fatal result is not due to an inoculation occurring whilst the animal is in the state of a "negative phase." If we next consider the large group of pathogenic bacteria, evidence has long since accumulated that by increasing the antibody activity against the various bacteria of this group a condition of increased resistance can be attained. Here, again, we have the intoxication due to bacterial infection affected by altering the antibody activity. Finally comes the group of bacteria to which the animal is very immune—i.e., the bacteria are non-pathogenic. This group cannot be made pathogenic—i.e., to produce the signs of intoxication if the immune animal is first of all inoculated with a large dose of dead bacteria and then with living ones of the same kind. The method of increasing the antibody does not increase the toxic formation, hence they are quite different from the first group; they again form a potent argument against infection in the first group, being due to inoculation during a negative phase. Here the relationship between antibody activity and antigen is such that when these bacteria are inoculated no toxic disturbance is produced by their interaction. There is further evidence from experiments in sensitised animals of the relation between the antibody activity and intoxication. If a series of guinea-pigs is inoculated with 20 c.mm. of a 10 per cent. sheep red cells suspension, on the thirteenth to fourteenth day the following results can be obtained on reinjection:—

		Result.
(1)	Gp. reinoculated i.v. with 1 c.cm. of 10% sheep red cell suspension ...	Nil.
(2)	,, ,, ,, do. sensitised with 1 unit of amboceptor	Nil.
(3)	,, ,, ,, do. with 5 units of amboceptor	Nil.
(4)	,, ,, do. with 25 units of amboceptor	Animal ill, rapid recovery.
(5)	,, ,, ,, 100 units amboceptor	Acute death.
(6)	,, ,, ,, 500 ,, ,,	Do.

Here by increasing the amount of antibody acting in the tissue cell on the antigen a fatal result can be produced. The increase in the antibody does not act by increasing the lysis in the plasma, the antibody already there is sufficient to do so. In the second week of sensitisation the titre of the serum is as high as it is in the third week. Again, in partial desensitisations the effect of a small sublethal reinjection is to reduce the activity of the antibody as a whole, but acute shock can be still obtained after such partial desensitisation by injecting a very much larger dose of the homologous antigen than is necessary to cause the acute anaphylactic shock in a non-desensitised animal.

These experiments show the importance of the factor of the relationship between the balance of antibody activity and antigen in anaphylaxis.

Functions of Circulating and Tissue Antibodies.

I want now to consider the functions of the circulating and tissue antibodies. As the result of the experiments of Dr. Bach and myself it would appear (1) that the antibody-complement complex does not act as a proteolytic ferment as far as can be definitely ascertained by chemical means when the experiment is carried out with absolute sterility; (2) that the antibodies do not act as agglutinins or opsonins in vivo.

Dealing with bacteria inoculated into the circulation we have shown that they are not agglutinated in vivo by the natural or acquired antibodies. The bacteria are removed from the circulation by a process of clot formation occurring in the capillaries of the liver, spleen, and lungs, the bacteria acting as foreign particles, and then phagocytosis occurs. Even intensely pathogenic bacteria against which the animal has apparently no antibodies at all—e.g., the *B. dysenteriæ Shiga* in the rabbit, are removed from the peripheral circulation as rapidly as those against which the animal has an agglutinin. Further, the presence of a powerful agglutinin in the serum of an animal in no way hurries on the removal of the bacteria from the circulation, the rate of removal of pneumo-bacilli or typhoid bacilli occurs as rapidly in the normal as in a highly immunised animal with

a very high agglutinating titre against these organisms. Similarly in the serous cavities and subcutaneous tissues the antibodies can be shown not to act as agglutinins or opsonins. The process of phagocytosis is purely a response to the presence of foreign particles. The antibodies do not appear to hurry the process of removal and phagocytosis of the bacteria in the initial stages of infection. There is definite evidence, however, that the antibodies act as lysins in the circulation. This can be demonstrated by experiment with rabbits sensitised against red corpuscles; reinjection with the homologous red cells is always accompanied by hæmoglobinæmia. Lysis also plays an important part in the anaphylactic shock. Although acute anaphylactic shock is essentially a cellular reaction the lysis of the red cells is an important preliminary, since without this the antigen is unable to get into the cells wherein the reaction occurs. The excised uterus of a guinea-pig sensitised to red cells will only react if the homologous red cells used for the reaction are hæmolysed. Similarly in bacterial anaphylaxis reinoculation with the homologous whole bacteria does not bring about shock; only when a bacterial extract is used can acute shock be obtained. Comparing this with the ease with which acute shock occurs on reinjection of red cells in sensitised animals, it appears that lysis of bacteria must be relatively much slower. Dr. Bach and I have endeavoured to demonstrate the presence of lysed bacterial protein in the blood of infected animals by a complement-fixation test, but have failed to get any evidence of the presence of such lysed bacterial protein; it may be that it is rapidly taken up by the tissue cells. Zinsser and Parker claim, however, to have obtained positive results. The Pfeiffer phenomenon also shows that the antibodies cause lysis of bacteria in the serous cavities, and the same can be demonstrated in the subcutaneous tissues. Excess of antibodies, on the other hand, appears to prevent lysis of the homologous antigen. This is seen in the Neisser-Wechsberg phenomenon in vitro, and can be shown in vivo in highly immunised guinea-pigs. If some guinea-pigs are highly immunised against the cholera vibrio, reinjection of these vibrios into the peritoneal cavity is not followed by the ordinary Pfeiffer's reaction; the bacteria do not become motionless, nor swell out, nor break up into granules. This action only occurs in highly immunised animals, and has apparently no parallel in normal ones. The circulating antibodies would appear therefore to act chiefly by sensitising the bacteria (i.e., combining with them) before phagocytosis occurs, and then, owing to this, hurrying on the process of lysis and destruction in the phagocyte. In the serous cavities and subcutaneous tissues the same process of sensitisation occurs, but the rate of phagocytic removal is much slower. In the latter site the bacteria may remain free for quite long periods. Bacteria, either in the circulation or elsewhere, which have not been phagocyted may undergo extracellular lysis, and thus also finely divided bacterial protein will be rendered available for interaction in the tissue cells. Now, antibodies do not exist as such in the tissues; they cannot be demonstrated as such even in the most immune animals, though there can be no doubt that those in the body fluids are derived from the tissue cell. Vice versa, antibodies injected into an animal during passive immunisation become absorbed by the tissues and undergo some change there, so that, though they can no longer be demonstrated as such, they confer hypersensitiveness on the tissues. The tissues of an immunised animal which as a whole is not hypersensitive—i.e., in the anaphylactic state—appear to react in vitro like those of one in that state. It would thus appear that the circulating antibody is protective, so that by combining with the inoculated antigen it prevents the acute anaphylactic shock or even delayed shock. Here, again, the protection is relative; a highly immune animal with a large amount of circulating antibody can practically always be killed by acute anaphylactic shock or delayed shock by increasing the dose of homologous antigen inoculated. This analysis shows: 1. That there is a great similarity between the symptoms of bacterial intoxication and protracted anaphylactic shock. Occasionally acute anaphylactic symptoms may occur in an infected animal. Frequently the final symptoms are very much like those of acute anaphylactic shock. 2. The presence of "anaphylotoxin" in the effusions of animals dying from bacterial infection. This "anaphylotoxin" is not due to autodigestion of the plasma, nor due to proteolytic digestion of the bacterium. 3. That as in sensitised animals so in infection, the occurrence of poisoning can be affected by altering the balance of the antibody activity to the antigen. This cannot be explained by the antibody producing simply more rapid lysis and so liberation of preformed endotoxin, since in the experiments with *B. lepræ*, *B. mycobacterium bovis*, *B. tuberculosis* (human), &c., no rapid lysis occurs, the bacteria multiply and produce typical infection and not simply an intoxication.

Nature of Anaphylactic Shock.

The infection intoxication is more to be compared to protracted anaphylactic shock. Now, acute anaphylaxis is a tissue reaction. What is the nature of the protracted shock? Delayed anaphylactic shock occurs when the rate of entry of the reacting dose of antigen into the circulation and thence to the tissue-cells is slow—i.e., when the route is either the intraperitoneal or subcutaneous. Here the slow rate of entry allows partial and slow desensitisation of the activity of the cellular antibody to occur. The reaction between the first small dose of antigen and the antibody is relatively slight, partial desensitisation occurs, and as more antigen accumulates slowly in the cells this desensitisation gradually progresses, and thus the interaction and consequent toxic formation becomes less and less, and in this way the total toxic formation is not very great. In these cases the interaction producing the intoxication might be supposed to be largely or to some extent between the antigen and the circulating antibodies, the cellular antibody having become completely or greatly desensitised. But against this is the fact that after complete desensitisation intraperitoneal or even intravenous inoculation produce no toxic effects, and this is not due to complete loss of complement or antibody in the circulation. Hence delayed anaphylaxis is largely a cellular reaction, although the circulating antibody may play a part and some anaphylotoxin be produced in the serous cavities, &c.

Contrast between Infection and Anaphylaxis.

How far can infection be compared to this? Can a state of hypersensitiveness be demonstrated in the tissues of an animal highly susceptible to a certain bacterium?

There appears to be no evidence in favour of this. Dr. Bach and I prepared an extract of highly virulent *B. coli*, and added some to the excised uterus and intestine of a normal guinea-pig suspended in a bath of aerated Locke's fluid without producing any reaction. The animal which is highly susceptible to a given bacterium need not necessarily have its tissues in a state of complete hypersensitiveness, so as to produce the typical anaphylactic reaction when its unstriped muscle tissues are exposed to the lysed bacterial protein, the tissues may have various degrees of hypersensitiveness. This can be demonstrated in vivo by the varying temperature reactions occurring on reinjection with the homologous antigen in animals which have been sensitised for different periods, and so have different amounts of antibodies according to the interval elapsing between the first injection and the reinjection.

Course of Events in Infection.

In infection the course of events is much as follows: (1) The bacteria gain access usually to the tissues or serous cavities. Primary blood infection is rare. (2) In the tissues and serous cavities phagocytosis rapidly occurs; if the infection is small, then the phagocytosis may be almost complete, with bigger infections a certain number of the bacteria remain free for quite a long time. The bacteria phagocyted may—

(*a*) Be killed with little or no toxin production; (*b*) be killed with marked toxin production leading to phagolysis with the liberation of the killed and lysed bacteria and the toxins formed during the intra-phagocytic reaction. (*c*) mostly survive, some lysed, marked toxin production may occur; phagolysis ensues with liberation of the whole bacteria, lysed bacterial protein, and the results of the interaction.

Those left unphagocyted may be similarly affected in the tissue fluids. Here there will theoretically always be some "anaphylotoxin" production as the result of interaction between the bacteria and the fluids of the body, just as in an in vitro experiment with bacteria and serum. The toxic products of interaction in the free and fixed phagocytes are probably of a similar nature—these when sufficient in amount will produce the symptoms of fever, &c., as has been experimentally shown. When lysis occurs the lysed bacterial protein can the more readily gain access to the tissue cells in various parts of the body, and hence the interactions will occur more vigorously. If there is sufficient tissue antibody already present a certain degree of interaction with resulting intoxication will immediately take place, the intensity depending on the relative proportions of antigen and antibody, and in some cases acute death may occur. If death does not occur, there will be a certain degree of desensitisation of the antibody which may lead to freshly arrived

bacterial protein causing no or only slightly increased toxin formation. The arrival of this protein leads to the mobilisation and new formation of circulating antibodies and their tissue cell progenitors leading to a gradually increasing condition of hypersensitiveness. If there is no more protein, the bacteria having been finally completely destroyed in the phagocytes, plasma, &c., then there will be no more toxin production, the animal may recover or die as the result of the intoxication. If, however, the bacteria are not killed, more and more protein will get to these tissue cells and produce interactions leading to fresh toxin formation with periods of cessation or diminution owing to various degrees of desensitisation. In this way the fight goes on till either the animal dies, frequently with a violent terminal reaction producing a sort of acute anaphylactic type of death or recovers, in that finally all the bacteria and lysed protein are rendered harmless. In some cases the animal may die long after the initial infection, long after the bacteria have been killed, by reason of the increased tissue katabolism set up by the infection continuing. That such a process of toxin formation, increase in the amount of antibody, and periodic, partial, or complete desensitisation may occur is seen from the experiments of Friedberger, where it was possible to produce any type of temperature reaction in a normal or sensitised animal by varying the successive doses and intervals of inoculation of the antigen. It cannot, of course, be absolutely put out of court that bacterial protein in itself may be slightly toxic, and that when it gets into the tissue cells produce changes and interaction of the type of those produced by proteoses.

Certain Conclusions.

I think it can be regarded as probable that the toxin is apparently not due to (*a*) proteolytic degradation of the bacteria by the antibodies; (*b*) auto-digestion of the plasma; (*c*) preformed specific endotoxin; but (*d*) is due to some interaction, the nature of which is as yet obscure, occurring between the tissue and to a lesser extent the free antibodies and the infecting bacterial protein, and according to the intensity of interaction more or less intoxication occurs. The type of intoxication which suggests itself as occurring during the interaction is to my mind closely paralleled by the auto-poisoning produced from damaged muscles during wound shock.

The Croonian Lectures

ON THE

PSYCHOLOGY OF THE SPECIAL SENSES AND THEIR FUNCTIONAL DISORDERS.

Delivered before the Royal College of Physicians of London, June, 1920,

BY ARTHUR F. HURST, M.A., M.D. OXON., F.R.C.P.,
PHYSICIAN AND NEUROLOGIST TO GUY'S HOSPITAL.

LECTURE III.*—HEARING, LISTENING, AND HYSTERICAL DEAFNESS.

MR. PRESIDENT AND GENTLEMEN,—Hysterical deafness is probably less rare in civil life than has generally been supposed. In this lecture its ætiology will be primarily discussed in the light of experience gained from the observation of numerous cases occurring in soldiers, among whom it was comparatively common, and a small number of severe cases in civilians.

The noise and concussion produced by the explosion of a shell of high power in the near neighbourhood frequently caused deafness. The patient was dazed or unconscious as a result of the explosion, and when his mind became clear again he discovered that he could not hear. Both ears were generally affected, but the one on the side more exposed to the explosion of the shell was often deafer than the other. The initial deafness was doubtless due to concussion of the internal ear, as it was sometimes associated with vertigo and temporary nystagmus. One or both drums were often perforated owing to the sudden enormous change in atmospheric pressure. Such a perforation did not greatly affect the prognosis, as the tear generally healed, and in the absence of hysteria normal hearing was restored.

The deafness might pass off in the course of a few hours, but more frequently it lasted for a few days. If it persisted for a still longer period it was almost always hysterical, at any rate in part. The initial concussion-deafness made such an impression on the mind of the soldier that on coming to himself his first thought was for his hearing, and he might be so convinced that he was permanently deafened that he became actually deaf as a result of auto-suggestion. This was especially likely to be the case if for any reason the idea of deafness had previously entered his mind; it was for this reason that a large proportion of cases occurred in men who had old disease of the ear.

The temporary deafness, which was a familiar condition before the war both in gunners and other people who were exposed to the frequent repetition of loud noises, might in the same way become perpetuated and exaggerated by auto-suggestion.

Lastly, organic deafness, especially if the onset is acute, as in that due to involvement of the auditory nerve trunk in cerebro-spinal meningitis, may remain complete after the disappearance of the active disease has been followed by sufficient restoration of the structures involved for a certain amount of hearing to have returned. This, again, is due to auto-suggestion, the final deafness being organic with a superadded hysterical element, which is capable of removal, like all hysterical symptoms, by psychotherapy.

If left untreated without any encouragement, and especially if steps are taken to teach the patient lip-reading, he will become more and more convinced that he is permanently deaf, the effect of the original auto-suggestion being increased by the unconscious hetero-suggestion of those in charge of the patient.

PATHOGENESIS.

Hearing does not consist merely of the perception of impulses conveyed to the brain when the ear is stimulated by sound waves. It is an active process, and in order that sounds may be heard the individual must listen. Inattention during a dull sermon results not only in absence of perception of the words said, but of total deafness to the sound of the preacher's voice It is clear that impulses to the cortical centre of hearing must be actually interrupted by inattention. The most satisfactory theory is that in the act of listening the resistance at the various synapses in the auditory path becomes diminished by some such process as a throwing out of dendrites, which brings those of contiguous neurones into more intimate connexion. In inattention the synapses are unswitched, the resistance being increased by the retraction of the dendrites.

In animals there is an obvious motor element in listening in addition to the sensory element just considered. This is seen in the movements of the external ear, which is most obvious in those which depend upon flight, prompted by the acuity of their hearing, for safety from their enemies. If one pays attention to one's own sensations in the act of listening, it appears as if some active motor process was taking place in the ear. This probably consists in the simultaneous contraction of the stapedius and tensor tympani muscles, which exert tension on the chain of ossicles in opposite directions. Their function appears to be to regulate the balance of the stapes and so modify the intravestibular pressure that the cochlea may act at its maximal efficiency. The small muscles of the external ear are generally regarded as rudimentary and functionless structures in man. Keith has pointed out that muscles which are never used tend in the course of many generations to disappear. But the muscles of the external ear are invariably found in man, and therefore differ from those rudimentary muscles which have either disappeared altogether or are only found in a minority of human beings. They are, moreover, as well developed in man as in apes. It thus appears probable that they are not as inactive as is generally supposed, and that their activity is not confined to the occasional display of their power by the comparatively small number of individuals who can voluntarily move their ears. How strong the muscles may be was well shown in the case of a soldier who constantly saw in his dreams a

* Lectures I. and II. were published in THE LANCET, July 24th, p. 169, and July 31st, p. 235, respectively.

German whom he had bayoneted in the face; at the same time he developed a bilateral spasm of his face, which recurred every few seconds. Every muscle supplied by the facial nerve was involved, including those of the ear, the movements of which were extraordinarily well marked, although the patient had never been able to move his ears voluntarily. When the dreams disappeared as a result of psychotherapy the spasms also ceased.

On closely watching the ears of a man who was listening intently I found that a definite movement always took place. I have since confirmed this in several individuals. In some cases the outer edge of the auricle moved outwards and forwards on listening to a sound in front, and inwards towards the side of the head on listening to a sound behind. The most vigorous movements I have seen occurred in a man who could move his ear voluntarily, and who was also aware that he moved it when he listened intently. It is, of course, obvious that these movements are mere remnants of the big movements in animals, which have the object of concentrating as many sound waves as possible in the external auditory meatus.

The contraction of the stapedius and tensor tympani might be thought to play a more important part, but careful observations made with W. M. Mollison failed to show the slightest alteration in the process of hearing in complete unilateral facial paralysis, including presumably the stapedius muscle.

When a man is temporarily deafened by a loud noise or by some recoverable disease he finds that he is unable to hear however much he tries, and consequently after a time he gives up trying. That is to say, he ceases to listen, and when the cause of the deafness at last disappears he has become so convinced that he cannot hear that he makes no further attempt to listen. Although the sound vibrations reach his ears in the normal way, they do not give rise to the slightest auditory sensation because of this inattention; he is then suffering from hysterical deafness, the inability to hear having been suggested by the original organic, though temporary, deafness. Severe hysterical deafness developed in a soldier while he was the only Englishman in a German prison. He ceased to pay attention to what was said as he could understand nothing, and in time he ceased even to hear the unintelligible conversation of his companions. His hysterical deafness was rapidly cured by psychotherapy when a year later he came under the care of Major J. F. Venables at the Seale Hayne Hospital.

In hysterical deafness the synapses at one or more of the cell-stations in the auditory path to the cerebral cortex must therefore be unswitched, possibly as a result of retraction of the dentrites. Further evidence for this follows from a study of the auditory motor reflex.

Auditory Motor or Jump Reflex.

A sudden noise normally causes an individual to jump and often to blink, and the pupils dilate; the "jump," at any rate, is a protective reflex and represents the preparation for flight or fight. The blinking cannot be suppressed by the majority of people, although expert revolver shots are said to acquire inhibitory power over it. It is very doubtful, however, whether they ever suppress the pupil reaction.

An officer, whose left motor cortex had been almost completely destroyed, went to the *Man that Stayed at Home* about four months after he was wounded. His right arm jumped violently when the gunshot rang out on the stage, although no trace of voluntary movement returned until three months later. The efferent part of the reflex is thus subcortical. In certain war neuroses of emotional origin, in which the reflex is exaggerated, jumping continues during sleep and deep hypnosis, although the patient does not hear the noise which induces it, even in a dream. The afferent part of the reflex is thus also subcortical, the reflex being quite independent of actual hearing.

Experiments on animals by Sherrington and Forbes[1] confirm the conclusion we reached from clinical observations, that the auditory motor reflex is a function of the mid-brain. They showed that both the posterior corpus quadrigeminum and the medial corpus geniculatum are concerned. The close relation of these centres to the blinking and the sympathetic pupilo-dilator centres in the neighbourhood of the third nerve nucleus, and to the anterior corpus quadrigeminum and red nucleus, in each of which a descending motor tract originates, gives an anatomical basis for this view. In the experiments of Sherrington and Forbes on cats, sounds, especially barks, yowls, and whistles of birds, excited orientatic reflex movements of the pinna and neck after the complete removal of the cerebral hemispheres, striata, and thalamus. Reflex movements expressive of anger and aggression—lashing of the tail with bristling of its hairs, and flexion and extension movements of the limbs—were also produced. In our cases of complete bilateral deafness the auditory motor reflex was completely absent, but returned simultaneously with the restoration of hearing as a result of psychotherapy. A very nervous but totally deaf mute remained completely unmoved, never jumping or showing a flicker of his eyelids during one of the severest thunderstorms I have known, and yet the next day he was completely cured by suggestion under partial anæsthesia.

A slight reflex was present in most cases of severe but incomplete hysterical deafness, but it became less marked, and sometimes disappeared completely, or was confined to a slight dilatation of the pupil when the test was repeated.

The abolition of the auditory motor reflex in absolute hysterical deafness makes it clear that one or more of the unswitched synapses in hysterical deafness must be at the level of the reflex, or still lower in the auditory nucleus or in one of the intermediate cell stations—the superior olive or the nucleus of the lateral fillet, or perhaps in all.

The persistence of the deafness during hypnosis and natural sleep shows that when the inattention of hysterical deafness has lasted for a considerable period, the unswitching of the synapses is more profound than that which normally occurs during deep sleep, in which the synapses can always be forced by a loud noise.

DIAGNOSIS.

In the observations I carried out at Netley with E. A. Peters we found it necessary to discard almost all the criteria formerly used in the diagnosis of organic deafness from deafness due to hysteria or malingering.

History.

Complete bilateral deafness following the explosion of a powerful shell was generally hysterical, though a lesser degree of asymmetrical organic deafness of a more or less permanent nature might be produced at the same time, owing to perforation of the drum or hæmorrhage into the middle ear, both of which were often followed by otitis media or to dislocation of the ossicles. It is still doubtful whether absolute organic deafness ever results from hæmorrhage into the internal ear following aerial concussion, as no anatomical evidence of such an occurrence has yet been forthcoming. Deafness following an acute illness is, at any rate in part, always organic, but we have found that the deafness may be increased as a result of auto-suggestion, no spontaneous improvement in function occurring when the anatomical condition improves.

Other Evidence of Hysteria.

Our investigations have shown that hysterical symptoms may develop in the most normal individuals if the suggestion which provokes the symptoms is sufficiently powerful. No more powerful suggestion of deafness could be imagined than the organic but temporary deafness caused by the noise of an explosion in the immediate neighbourhood. It is therefore not surprising that hysterical deafness has occurred almost as frequently in soldiers, who have no personal or family history of neuroses, as in those with a neuropathic predisposition. Deafness has consequently been the only hysterical symptom in the majority of cases. When, however, the onset was associated with extremely terrifying circumstances, some of the physical results of fear, such as mutism and tremor, were often perpetuated as hysterical symptoms. Thus hysterical deaf-mutism was quite common. In two cases sand was thrown into the patient's eyes from the sand-bags on which the shell exploded, and the hysterical deafness was accompanied by hysterical blindness which followed the conjunctivitis caused by the irritation of the eyes with the sand.

The only conclusion which can be drawn from these facts is that while the association of deafness with mutism or with tremor is very suggestive of hysteria, hysterical deafness occurs most frequently in otherwise normal individuals with no symptoms or history of neuroses.

The Supposed Association of Hysterical Anæsthesia of the External Ear with Hysterical Deafness.

Ever since Briquet[3] in 1859 described the association of hysterical deafness with anæsthesia of the external ear, this has been regarded as an almost constant phenomenon.

J. L. M. Symns, R. Gainsborough, and I[4] noted the sensibility of the external ear in a series of 29 soldiers, all suffering from organic deafness, due to various causes and of varying degrees of severity. The ears were first touched lightly with a finger or some wool, sometimes beginning with the deafer ear, sometimes with the ear which was less deaf or normal; at the same time the patient was asked, "Which side do you feel more distinctly?" A similar comparison was then made between each ear and the cheek on the same side. In 28 out of the 29 cases hearing was distinctly better on one side than the other, and in several the latter was normal; 18 of the 28 had partial anæsthesia, and 4 had hyperæsthesia of the affected ear; the better ear was normal in every case. In the single case in which the deafness was equal in the two ears there was no anæsthesia; but this man did not appreciate that he was deaf at all, a slight degree of deafness having only been discovered when the ears were examined on account of other symptoms. The 6 cases of asymmetrical deafness, in which no anæsthesia or

hyperæsthesia was found at the first examination, were then examined again, but a gross form of suggestion was now employed, the patient being asked the following questions: "You feel my finger less clearly when I touch this ear (the deafer one), than this one, do you not?" and "You feel me touch this ear (the deafer one) less clearly than your cheek, do you not?" Four out of the six patients answered "Yes"; in the remaining two the degree of deafness was very slight. In several of the patients anæsthesia was found to be very well marked, and was associated with complete or partial analgesia. So real was this loss of sensation that one patient was subsequently seen putting a pin through the lobe of his ear for the amusement of the other men in his ward.

In a case of severe bilateral hysterical deafness examined in the same way both ears were found to be completely anæsthetic. In a second case, in which one ear was totally deaf owing to organic disease, and the other had been totally deaf owing to hysteria, but was now only partially deaf as a result of psychotherapy, the organically deaf ear was found to be anæsthetic, and the hysterically deaf ear was normal, corresponding with the fact that the deafness of the former was much more severe than that of the latter.

It is thus clear that the supposed association of hysterical anæsthesia of the external ear with hysterical deafness is a complete fallacy, and that anæsthesia is likely to occur in a deaf ear if looked for, whether the deafness is organic or hysterical, so long as the individual is sufficiently suggestible and not too well educated. Thus in all the above cases the patients were soldiers who had been on active service, and our experience has shown how remarkably suggestible the majority of war-worn soldiers are, even in the absence of any hysterical or other nervous symptoms. The results obtained with ordinary hospital patients was consequently less striking. Among four adult male civilians, three females, and two boys, all of whom were deaf in one ear or deafer in one ear than in the other, only one of the adult males had an anæsthetic external ear. When, however, they were shown two test-tubes, one of which was said to contain hotter water than the other, and were asked to say which side was touched with the hotter tube, eight out of nine said that the deaf (or deafer) ear felt the heat more than the other ear, although in every case the same tube was used for touching both ears.

Ten well-educated individuals who were asked whether they would expect any difference between the sensibility to touch in the two external ears if they were deaf on one side only replied in the negative. On the other hand, seven indifferently educated men all replied in the affirmative. The difference is simply due to the fact that no intelligent man would expect his external ear to be anæsthetic if he were deaf, but a man of less education would act upon the suggestion implied in the question without criticising it. The greater frequency of grotesque hysterical symptoms among hospital than private patients, and among private soldiers than officers, is doubtless due to the greater intelligence and greater development of the critical faculties of the latter.

Bone and Air Conduction.

When deafness is not absolute a tuning-fork can still be heard by bone conduction (positive Rinne's test). This shows that the deafness does not depend on changes in the middle ear, even when these are present. But it does not distinguish between the nerve deafness due to organic disease and that due to hysteria. Moreover, the test can only be applied in the slighter cases, as in many instances deafness is absolute and no hearing is possible, whether the sound is conducted by bone or through the air. The vibration of a tuning-fork held on the mastoid process is, however, often felt, and the aerial vibration caused by very loud noises is occasionally appreciated, even when no sound is heard.

Auditory Motor Reflex.

In absolute deafness, whether due to organic disease or hysteria, the auditory motor reflex is absent. In partial deafness it is present, and from what has already been said on this subject it is clear that the presence of the auditory motor reflex does not necessarily imply that hearing occurs. This is of considerable practical importance, as an examination of the reflex has in the past often been used as a test of severe but not absolute deafness in mute children and in supposed malingerers, although a man who says he can hear hardly anything, but shows a normal reflex, is not necessarily a malingerer, for he may be suffering from genuine hysterical deafness or even organic deafness due to a bilateral lesion of the cortical auditory centres.

Persistence During Sleep; Effect of Hypnosis.

As hysterical symptoms are due to suggestion, it might be expected that they would not persist during sleep, and Babinski regards this as a definite law. My experience agrees with his with regard to all other hysterical symptoms which I have investigated, such as paralysis, contractures, and anæsthesia; I have seen several deaf-mutes and one aphonic who talked naturally in their sleep, and a man with hysterical amnesia had nightmares referring to his period of amnesia. But hysterical deafness, the behaviour of which during sleep does not appear to have been tested by Babinski, is an exception. Thus, greatly to my surprise, I found it quite impossible to wake two of my patients, who were suffering from total hysterical deafness and were sleeping in a hut by themselves, by shouting or by making other very loud noises within a foot of their heads. I convinced myself that deception was impossible, and the hysterical nature of the deafness in both cases was at a later date conclusively proved by their instantaneous recovery with powerful suggestion. In one patient a slight twitch of the eyelids was sometimes observed with a particularly loud noise, but not in the other. It seems probable that a malingerer could be detected by this test, as he would certainly wake if a loud noise was made when he was asleep, whereas in hysterical and organic deafness waking does not follow.

I had expected that hearing would return in hysterical cases during hypnosis, but I found it quite impossible to make the patients whom I had deeply hypnotised obey any command or show any signs of hearing, and no auditory motor reflex was produced. The unswitched synapses thus appear to remain unswitched during hypnosis as they do during sleep.

Character of the Voice; Lip-reading.

In almost all cases of severe deafness due to organic disease the character of the voice changes. It is difficult to understand why there should be any difference in the effect of total deafness on the voice, whether it is organic or hysterical, as the change is simply a result of the patient's inability to hear his own voice. Although in some of our hysterical cases the typical voice of the organically deaf developed, the majority showed no change in timbre or intonation.

When a deaf man teaches himself lip-reading his deafness must be of a high degree. Several patients with hysterical deafness learnt it with remarkable rapidity, so that it cannot be regarded, as has been suggested, as a sign of organic disease. On the other hand, it is very unlikely that a malingerer would ever learn lip-reading.

Vestibular Symptoms and Reactions.

Disturbances in the vestibule as a result of concussion may cause spontaneous nystagmus, which may be accompanied by giddiness and staggering, but these symptoms rarely last for more than a few hours. We have found that the only test upon which almost complete reliance can be placed in the diagnosis of absolute hysterical deafness from absolute organic deafness is the presence of normal vestibular reactions in the former and their loss in the latter. The vestibular reactions are entirely beyond the control of the will, and it is therefore inconceivable that they should disappear as a result of suggestion. As hysterical symptoms are always caused by suggestion, the vestibular reactions must remain unaffected in hysterical deafness. On the other hand, it is highly improbable that any organic lesion could damage the cochlea or the cochlear nerve or nucleus on both sides sufficiently to cause total bilateral deafness without at the same time damaging the vestibules or vestibular nerves or nuclei, so that total organic deafness is almost certain to be accompanied by deficiency in the vestibular reactions. The only exception of which I have heard is a case reported by Fraser[5] of a congenitally deaf man, in which microscopical examination of both inner ears showed that the organ of Corti was so malformed that hearing was almost abolished, while the vestibules were normal. The caloric reaction was noted on both sides some days before death, and a normal response was obtained.

The vestibular test has proved of great value in cases of total deafness. But it must be remembered that in partial organic deafness the vestibular reactions may be lost in severer cases and exaggerated in slighter cases; any hysterical element which may be present in such cases can only be recognised by the improvement which follows psychotherapy. The vestibular reactions may be investigated by the rotation, caloric, or electrical tests, in all of which nystagmus and giddiness occur in normal individuals, but not if the vestibular nerves are damaged. We have employed the rotation test, as it requires no special apparatus, the patient turning rapidly round five times in one direction and subsequently in the opposite direction. The character and degree of the nystagmus on looking in the direction opposite to the rotation is estimated, and the subjective and objective evidence of vertigo is investigated. The rapidity of the movements of the eyes and their duration should be the same when the individual is rotated clockwise or counter-clockwise. If any inequality is observed, one vestibule must be involved and the other spared, or one must be involved more than the other. An equally simple and satisfactory test[6] is for the patient to turn five times round a walking-stick, which he holds in the erect position, with his back bent, so that his forehead rests upon the handle of the stick; he then attempts to walk along a straight line marked on the floor. A normal

individual diverges from the line in the same direction as he has been turning, the angle being equal whether he turns to the right or left, but in severe bilateral vestibular disease he walks straight forward, or if the ears are unequally affected the angle differs according to the direction he turns.

The following remarkable case well illustrates the fallacious character of the criteria which were formerly regarded as sufficient to make an accurate diagnosis possible.

Hysterical total deafness in a man of 18 dating from infancy.—G. C., a deaf-mute, 18 years old, appears to have become deaf after a fall on his head some time between the age of 3 and 9 months. His mother is certain that he could hear as a small baby, although at a later date a number of aurists were consulted, who all stated their belief that this observation must be incorrect and that he must have been deaf from birth. With great difficulty he was taught to speak, but he has the characteristic extremely indistinct speech of a deaf-mute. He does not remember ever having heard anything at all, except on rare occasions during the last few years, when he thinks he has sometimes heard a loud noise, though possibly he really only felt the vibrations of the sound. When I first saw him in May, 1919, he appeared to be totally deaf, but there were no signs of middle-ear disease and the vestibular reactions were perfectly normal. The auditory motor reflex was completely absent. I explained to him by means of lip-reading, at which he is an expert, that he could not hear because he had never tried to listen, and that if he once made an effort to listen he would begin to hear. On this first visit he was taught to listen sufficiently to hear his name called close to his ear; this was the first word he ever remembered having heard. The same day he heard his bicycle bell and a motor horn for the first time. During the course of the next three weeks, in which it was impossible to give him more than an occasional short lesson, he learned to hear a number of words, each of which had to be taught separately, as, although he could hear the sound, it conveyed nothing to him until he realised what the word was by lip-reading. When once learned, he could understand it on a future occasion, but found it extremely difficult to continue to listen for more than a few minutes, so progress was slow. At his best he could hear a familiar word from the other side of the room without the voice being raised, but frequently it was necessary to shout a word into his ear. At the same time, he improved sufficiently to be able to hear all ordinary sounds; he could hear a band and he could hear notes played on the piano, but he had no idea of pitch and could not distinguish one note from another. The auditory motor reflex was now normal. I heard from his father on May 9th, 1920, that he continues to make steady progress. He now almost always looks up at once when anybody speaks, and seems to hear most sounds without any obvious effort.

In this case a young man of 18 had been a deaf-mute from infancy and the many aurists who had seen him in the past regarded his condition as obviously incurable; the complete absence of anything in himself or his relations which could be regarded as pointing to a tendency to neuroses, the absolute loss of bone and air conduction and of the auditory motor reflex, the persistence of deafness during sleep, the characteristic speech of the deaf-mute who has painfully acquired the power of making himself understood, and his great skill as a lip-reader might have been taken to prove beyond the shadow of a doubt that the deafness was organic. But the vestibular reactions were normal, and acting upon this alone we were able to prove the functional nature of the condition by restoring his powers of hearing by means of psychotherapy. The deafness which developed when he was about 3 months old must have been due to some organic but evanescent lesion. It occurred at a period when he was just learning to listen, and consequently interrupted his development in this direction. When the organic cause disappeared he had become unaccustomed to listen, and he never learnt to do so again. The deafness was thus really a product of suggestion, and as it is being cured by psychotherapy it can legitimately be regarded as hysterical.

A proper understanding of the psychological process involved in listening and of the disturbance in the process which results in hysterical deafness should lead to a great improvement in the treatment of the latter. When hysterical deafness is associated with mutism it requires no special treatment, as hearing almost invariably returns spontaneously when speech is restored. In order to make this still more certain the patient must be convinced that directly he speaks he will hear his own voice and that he will then hear everything clearly. There is rarely any difficulty in curing the mutism by simple explanation and persuasion, though in our earlier cases we occasionally resorted to the suggestion produced by applying faradism to the larynx or making the patient excited with an anæsthetic.

Treatment of Uncomplicated Hysterical Deafness.

Uncomplicated hysterical deafness is much more difficult to treat, and for a time our results were less satisfactory than in any other hysterical condition. For this reason we were induced to employ various forms of suggestion, although we realised that the methods were not really satisfactory. Suggestion under hypnosis was never of any use, as the patient remained deaf whilst hypnotised and consequently heard none of the suggestions which were made to him. Electricity as a means of suggestion was sometimes successful but often failed. In a number of cases of absolute bilateral deafness, which had resisted all other forms of treatment for some months, we performed "fake" operations, making a scratch behind the ear in the incompletely anæsthetised patient. I described two cases of this kind with Captain E. A. Peters in THE LANCET in 1917.[2]

This method of treatment was also not invariably successful, and at the best it was not one which could be regarded as desirable, as it is much more satisfactory for the patient to understand the exact means by which he has been cured than for him to be fooled into a cure by gross suggestion. With increased understanding of the psychological basis of hysterical deafness we were able during the last year of the war to cure a large majority of cases by the most rational form of psychotherapy—explanation, persuasion, and re-education. The patient is made to understand by written explanations how he has become deaf and how the original cause of his deafness has now disappeared; as the deafness was at first organic he could not hear, however much he listened, and consequently after a time he ceased to listen at all. He is next persuaded to listen intently, and is taught that listening is just as active a process as moving and requires a conscious effort on his part until it becomes automatic once more.

Even when a man has completely recovered his hearing it may take some time before he becomes accustomed to the new conditions, especially if he has been deaf for a long period. When caught unawares he often fails to hear, though directly he perceives he is being spoken to he listens and can then hear, even with his eyes closed, so that lip-reading cannot help him. In severe cases he may hear the sound of the voice without being able to distinguish what is said. Re-education is finally required in order that the sounds the patient hears, but at first cannot interpret, can be understood, that words which must at first be repeated separately from each other can be used in continuous sentences, and that the voice which must at first be raised can become progressively more quiet. A similar method of re-education can be employed for the many people who are suffering from some incurable form of deafness, who can in this way be taught to make the most of what powers of hearing they still possess.

Hysterical deafness after being struck by lightning; great improvement with psychotherapy nine years later.—Mr. S., aged 55, was struck by lightning in November, 1911, when in New South Wales. His horse was killed under him and he was left for dead by his companion who was riding with him. He was subsequently picked up and carried to a hospital, where he remained unconscious until the sixteenth day. A burn was found extending from the back of his head down the left side of his body to the hip. When he recovered consciousness he found that he had completely lost his hearing, and that his legs and arms were numb and partially paralysed. He slowly regained his power of movement, but continued to feel peculiar sensations in his limbs. The deafness was associated with a continuous noise in his head which reminded him of escaping steam. It was so persistent that it often rendered it difficult for him to get to sleep. When he left hospital he was told that his deafness was due to fracture of the base of the skull caused by the violence with which he struck the ground when he fell from his horse, as bleeding had occurred from his right ear.

When I first saw him in March, 1920, I found that his vestibular reactions were perfectly normal. He could not hear a whisper at all; loud-spoken words were only heard within 2½ inches from the left ear and 1 inch from the right. Low notes were heard better than high ones. There was no paralysis, but he complained of inability to walk more than a short distance, and he was still troubled with unpleasant sensations in his limbs. I could find no evidence of organic disease, and regarded the deafness as probably hysterical in origin. This opinion was confirmed by Mr. W. M. Mollison, who could find no evidence of disease in either ear. I explained to him that the terrific noise of the thunderclap had produced temporary organic deafness, and that this was the last impression he had before he lost consciousness. It was quite impossible that the deafness was due to a fracture of the base of the skull injuring the auditory nerves, as he had been told, as in that case the vestibular nerves would have been involved at the same time.

I explained to him that having once been deafened he had ceased to listen, and that when the temporary changes produced by the noise had disappeared he could hear again, but he had become so impressed by the fact that he was deaf that he had not tried to listen. He at once improved when he realised that in order to hear he had to listen actively. I gave him a few lessons myself, and he then continued to train himself whilst at home in Scotland. On the railway journey he found that he could hear what other people were saying in spite of the noise of the train, although he had never been able to do this before, and when he got home he found he could hear the voices of his relations which he had not heard since the accident. He trained himself to listen to everything that was happening around him, and for the first time since 1911 he could hear the singing of birds, footsteps in his neighbourhood, and clocks striking.

Although in the past it had been impossible for anybody to wake him by noises, he now found that quite slight noises might wake

him in the night, so that whatever the basis of the hysterical deafness might be, it clearly persisted during sleep, but was now no longer present. When I last saw him, on June 16th, he could carry on an ordinary conversation without difficulty. Mr. Mollison found that with the right ear, which had been previously almost totally deaf, he could now hear clearly spoken words at a distance of 18 inches, and with the left ear he could hear quietly spoken words six feet away, and a whisper at one inch. He himself has noticed that when his better ear is stopped he can carry on conversation when words are spoken slowly and clearly. At the same time his general health has greatly improved, and the noises in his head have almost disappeared. Whilst he learnt to give greater attention to sounds, he learnt at the same time to give less attention to sensations coming from his limbs, and consequently the paræsthesia of his limbs gradually disappeared.

Hysterical Hyperacusis.

The nervous individual who has a brisk auditory motor reflex which results in "jumping" at the least sound is familiar in civil life. An exaggeration of this condition was a common symptom in soldiers suffering from all forms of war neurosis which were emotional in origin. In its most marked form the patient jumped violently with sudden sounds, which could hardly be heard at all by an ordinary individual, and louder sounds produced violent universal tremors. The condition persisted during sleep, the patient showing the same exaggerated response to sounds, which did not necessarily wake him, although they generally slept more lightly than they had done before the war. The type of sound which produced this reaction was always one which was in some way reminiscent of shell explosions or other sounds of battle. Many patients realised this quite clearly in their waking state. In one severe case of the kind the patient, when deeply hypnotised, told me that he was always listening for shells, and jumped whenever a sound reminded him of them, although he had been unable to explain the symptom when he was awake.

I have already described the experimental and clinical observations which prove that the auditory motor reflex is a mid-brain phenomenon. I believe that its exaggeration in certain neuroses can be readily explained as a result of a mechanism exactly the reverse of that which leads to its abolition in hysterical deafness. Whereas in hysterical deafness the patient does not listen, a soldier who is in a state of constant terror becomes accustomed to listen for shells with abnormal concentration, and this concentration may persist when he is no longer at the front and no shells are bursting. Instead of the resistance at the synapses in the auditory tract being increased, as in hysterical deafness, it is diminished owing to the extreme degree with which the dendrites are extended. This results in an abnormally brisk auditory motor reflex, and probably also in abnormally acute hearing. We only tested the power of hearing accurately in one patient in whom the jump reflex was excessively developed. Captain E. A. Peters and I found that he could hear sounds at a distance four times as great as the average individual, which means that his power of hearing was 16 times greater than the average, as the intensity of sound diminishes inversely as the square of the distance. His acuity of hearing was most remarkable. Sentences whispered in one corner of a large room so quietly that a group of officers in the centre heard no sound at all were correctly repeated by him, although he was sitting in the opposite corner. The hyperacusis and jump reflex were quite uninfluenced by the administration of 100 gr. of bromide a day, and were only slightly reduced by plugging the ears with plasticine.

The increased resistance at the synapses in hysterical deafness persists during sleep. In the same way the diminished resistance in hyperacusis persists, as the patients wake with unusual ease in response to sounds, and also show a brisk jump reflex even when they do not wake.

References.

1. C. S. Sherrington and A. Forbes: Amer. Journ. of Physiology, xxv., 367, 1914.
2. A. F. Hurst and E. A. Peters: THE LANCET, ii., 517, 1917; and A. F. Hurst: Seale Hayne Neurological Studies, i., 279, 1919.
3. P. Briquet: Traité de l'Hystérie, p. 295, 1859.
4. A. F. Hurst, J. L. M. Symns, and R. Gainsborough: Review of Neurology and Psychiatry, i., 1918; and Seale Hayne Neurological Studies, i., 19, 1918.
5. J. S. Fraser: THE LANCET, ii., 872, 1917.
6. D. E. J. Moure and R. Pietri: Rev. de Laryngologie, d'Otologie, et de Rhinologie, xxxviii., 153, 1917.

THE NORMAL BASAL METABOLISM IN MAN,

AND ITS RELATION TO THE SIZE OF THE BODY AND AGE, EXPRESSED IN SIMPLE FORMULÆ.

BY GEORGES DREYER, C.B.E., M.A., M.D.,
FELLOW OF LINCOLN COLLEGE; PROFESSOR OF PATHOLOGY, UNIVERSITY OF OXFORD.

THE present analysis is entirely concerned with the study of basal metabolism—i.e., the metabolism of the individual during complete muscular repose, where a period of 12 hours had been allowed to elapse since taking the last meal. The communication is necessarily preliminary in its scope. The data which have been analysed are only those in which the metabolism was determined indirectly, by measuring the consumption of oxygen in a given unit of time. The formulæ which I have established have all been derived, both in the case of males and females, from the admirable and carefully conducted series of experiments on basal metabolism by Benedict and his co-workers, and the results obtained by other observers and quoted by him. These formulæ have then been applied to the observations of other investigators in America and elsewhere. In the present communication the metabolism of newborn infants and quite young children up to an age of about 5 years is not considered, because, while there exists a relatively long series of observations upon newborn babies, there are but few observations covering the years 1–5, a gap in our present knowledge which it is hoped will soon be filled in view of its great importance.

The relation between body surface and heat production was already suggested by the French writers, Rameaux and Sarrus, in the late "thirties" of last century. In the early "fifties" Bergmann took up the same line of argument in Germany. Müntz, in France, carried out the first actual experiments definitely relating body surface and metabolism in 1880. When the "body surface" law of metabolism is associated with Rubner's name this has its justification in the fact that he was the first spokesman for this theory to support its claims with sufficiently accurate and numerous determinations. Almost synchronously Richet advanced similar views. To give a detailed account of all the arguments put forward by later investigators for and against the "body surface" law, is beyond the compass of this short note. It is only necessary here to refer to the papers of Benedict and Du Bois and their co-workers, and to emphasise the importance of the work carried out by these investigators. Briefly, Du Bois obtained greater accuracy in calculation, using the "body surface" law, by making allowance for the standing height of the individual (as shown in his body surface height charts), while Benedict and his co-workers declared against the view that metabolism was a function of the surface, and they worked out relationships based on weight, standing height and age, and showed the superiority of this method of calculation for the prediction of the basal metabolism of any given normal individual. The relationships are easily calculated from the tables published by this author.

Before discussing the results of my analysis of the various data on basal metabolism I will here state the formulæ by which I have established the relationships between basal metabolism, body weight, trunk length, circumference of the chest and age, as follows:—

(1) The basal metabolism is a function of the weight and the age, which can be expressed in the formula $\frac{W^n}{C \times A^{0\cdot1333}} = K_1$ where the power n is approximately 0·5 and K_1 is a constant. This formula indicates that basal metabolism is *not* a simple function of the body surface.

(2) The relation between basal metabolism and trunk length can be expressed in the formula $\frac{\lambda^n}{C \times A^{0\cdot1333}} = K_2$ where the power n is approximately 3/2, though more accurately in males 1·567, in females 1·597, and K_2 is a constant.

(3) The relation between basal metabolism and the circumference of the chest can be expressed in the formula $\frac{Ch^n}{C \times A^{0\cdot1333}} = K_3$ where the power is approximately 3/2, though more accurately in males 1·37, in females 1·76, and K_3 is a constant.

In previous communications formulæ have been given expressing the relationships between body weight, trunk length, and the circumference of the chest respectively, as follows:—

(4) $\frac{W^n}{\lambda} = K_4$, where the power n is approximately 1/3, though more accurately in males 0·319, in females 0·313, and the constant K is for males 0·38025; for females 0·36093.

(5) $\frac{W^n}{Ch} = K_5$, where the power n is approximately 1/3, though more accurately in males 0·365, in females 0·284, and the constant K is for males 0·662, for females 0·30213.

In all of the above formulæ W = net body weight in grammes, C = total number of calories produced in 4 hours, A = age in years, λ = trunk length in centimetres, and Ch = the circumference of the chest in centimetres. Instead of making use of the formulæ (2) and (3), it is simpler to make use of the following formula:—

(6) $\frac{W^n}{C \times A^{0\cdot1333}} = K_6$, where W = the theoretical weight in grammes calculated by averaging the weights corresponding to the given trunk length and chest measurements, which can be ascertained from the tables[1] already published, in order to save the laborious calculation of these weights.

The importance of formulæ (2), (3), and (6) becomes evident when one is dealing with persons whose weight has become abnormal as a result of disease, for it is obvious that with loss of weight a metabolism which would be definitely abnormal when calculated in relation to the observed weight might be perfectly normal when calculated in relation to the calculated weight, or vice versa. No such interference with the size of the constant K will occur if the metabolism is calculated in relation to the trunk length (2), and only to a small extent if calculated in relation to the circumference of the chest, (3), *or* what amounts to the same thing, if the metabolism is calculated in relation to the weight determined from these two measurements (6). Making use of the detailed data for weight, age, and total calories for 24 hours given in Tables C and D in Harris and Benedict's book for men and women respectively, the following constants have been determined. In the case of the males (Formula (1)) $\frac{\sqrt[2]{W}}{C \times A^{0\cdot1333}} = 0\cdot1015 = K$. In this case the observations on 16 athletes and 11 vegetarians have been omitted, leaving 109 observations for the determination of the constant. In the case of the females (Formula (1)) $\frac{\sqrt[2]{W}}{C \times A^{0\cdot1333}} = 0\cdot1127 = K$ derived from the 103 persons examined. If in the case of the males all 136 observations are made use of, the constant becomes 0·1018. In comparing the constants for males and females it is evident that, as also maintained by Benedict and other observers, the average male has a greater metabolism than the average female of the same size and age—namely, about 10 per cent. more than the female. In applying Benedict's tables to other observers' data on persons of greatly varying age, such as children, grown-up, and old persons, one is struck in some cases by the marked discrepancy between predicted and observed calorie values of basal metabolism, while in other cases prediction and observation are extremely close, and on an average the correspondence between prediction and observation is better than can be obtained by using Du Bois's surface height charts. In view of this it was of interest to see not only how close the prediction became, using the formula here given, but also to make comparison between the actual constants obtained, using the data of other observers. For this purpose the following table has been constructed:—

Investigator.	No. of persons investigated.	Description.	Average K using author's formula. $\frac{\sqrt[3]{W}}{C \times A^{0\cdot1333}} = K$	Regardless of sign.		± % deviation for each group.	
				Average % deviation using formula. $\frac{\sqrt[2]{W}}{C \times A^{0\cdot1333}} = 0\cdot1015$	Average % deviation using Benedict's weight, height, age tables.	Author's formula.	Benedict's weight, height, age tables.
Palmer, Means, and Gamble	8	Men.	0·1037	3·70	4·40	− 2·12	− 4·40
Carpenter, Emmes Hendry, and Roth	31	,,	0·1014	5·94	5·30	+ 0·10	+ 0·46
Magnus Levy and Falk	10	,,	0·1000	5·06	5·27	+ 1·50	+ 3·71
,, ,, ...	5	Old men.	0·1045	9·90	10·36	− 2·87	+ 7·94
,, ,, ...	15	Boys.	0·1007	3·46	15·60	+ 0·79	+ 15·60
*Gephart and Du Bois	5	Men.	0·0989	6·10	7·37	+ 2·63	+ 6·75
Du Bois and Aub	6	Old men.	0·0993	8·20	19·83	+ 2·22	+ 17·80
,, ,, ...	8	Boy scouts.	0·0928	9·49	19·70	+ 9·37	+ 19·70

* In only five observations were the age and standing height given, and comparison therefore possible by Benedict's tables. The per cent. deviation for all seven observations by author's formula = 4·59 per cent.

From the above table it is readily seen how much better the agreement between prediction of metabolism and actual observation is when the author's formula is used than when Benedict's method of calculation is applied to this series of observations by different observers. It is also interesting to note that if the basal metabolism constant had been calculated from the eight series of observations, totalling 88 persons, the average constant would be 0·1004, giving a metabolism only about + 1·1 per cent. greater than the figure obtained from Benedict's and co-workers' observations. If the eight boy scouts of Du Bois and Aub are excluded, for similar reasons as the athletes (greater metabolism) were excluded from Benedict's series of men, the constant is 0·1012, a difference of only + 0·3 per cent., while these series show very marked deviations from his own observations when calculated by Benedict's method. The deviation between observation and calculation for Benedict's own series is, in the case of the males, 5·27 per cent. by the author's formula, 5·33 per cent. by Benedict's method, and 5·65 per cent. by Du Bois's method of calculation. In the case of the women the average per cent. deviations are by the author's formula 6·33 per cent., by Benedict's method 6·36 per cent., and by Du Bois's method 7·53 per cent. respectively. It should be pointed out that the deviations in the case of the author's formula will be considerably reduced if trunk length and chest circumference were considered. The actual data on this point will be published later. From the data available it is to be noted, as already emphasised by Benedict, that athletes have a greater metabolism than persons living a more sedentary life.

Conclusions.

(i.) The formula $\frac{W^n}{C \times A^{0\cdot1333}} = K$, where n is approximately 0·5 and K = 0·1015 in males and 0·1127 in

[1] "The Assessment of Physical Fitness by Correlation of Vital Capacity and Certain Measurements of the Body," by Georges Dreyer, in collaboration with G. F. Hanson. Cassell and Co. 1920.

females, expresses the basal metabolism in an extremely satisfactory manner over a wide range of body, size, and age, and indicates that basal metabolism is not a simple function of the body surface.

(ii.) By means of the various formulæ given in this paper it is possible to predict the basal metabolism of a normal person with greater accuracy than by the methods hitherto suggested.

Bibliography.—1. Dreyer, Georges: The Normal Vital Capacity in Man and its Relation to the Size of the Body, THE LANCET, 1919, ii., 227. 2. Dreyer, Georges, and Burrell, L. S. T.: The Vital Capacity Constants applied to the Study of Pulmonary Tuberculosis, THE LANCET, 1920, i., 1212. 3. Harris, Arthur J., and Benedict, Francis G.: A Biometric Study of Basal Metabolism in Man, 1919, Washington. 4. Aub and Du Bois, Gephart and Du Bois, and other observers mentioned: See Harris and Benedict, loc. cit.

ON THE SIGNIFICANCE OF BLOOD AND SOLUBLE "ALBUMIN" IN THE STOOLS.

BY ROBERT COOPE, M.D., B.Sc.,
LECTURER IN BIOCHEMISTRY, UNIVERSITY OF LIVERPOOL.

WHENEVER a lesion of the alimentary canal is suspected an examination of the fæces for blood and for soluble "albumin," provided the tests are adequately controlled, is frequently of immense value in diagnosis and prognosis, and may give useful indications of the progress or otherwise of treatment. This paper gives a few practical points concerning the technique and the value of the tests to the ordinary clinician, who too often wholly associates fæcal examinations with complex chemical analyses only possible in a laboratory.

A. *Methods.* 1. *Blood.*

A reaction for hæmoglobin (or its derivatives) in the fæces is only of value if the diet is strictly controlled. Any possible source of hæmoglobin (e.g., meat) must be excluded; and drugs, especially those containing iron, should be withheld for some days before the test. For this purpose a milk régime is satisfactory and convenient, as the typical canary-yellow colour of the stools corresponding to the diet makes it easy to recognise whether the portion of the stool examined corresponds or not to the régime.

The question of reagents is of importance. The usual tests employed in clinical work are Meyer's (phenolphthalein reagent), Weber's (guaiacum and ozonic ether or hydrogen peroxide), and the benzidine test (either with fæcal emulsion or with a smear on a microscopic slide). A critical examination of these various tests has recently been made by Lyle and Curtmann.[1] They find that the benzidine reaction is unreliable, difficult to control, and too sensitive; that Meyer's phenolphthalein reagent is too sensitive also; and they use a new preparation derived from guaiacum as their reagent for the test.

This criticism is certainly corroborated by clinical experience. Meyer's reagent is altogether too sensitive for the positive diagnosis of an occult hæmorrhage. Its sensitiveness, however, makes a negative reaction of great importance, and enables one to rule out definitely the presence of blood. In practice it is therefore wise first to do the Meyer test,[2] and, if this is positive, to control by Weber's guaiacum test. A diagnosis of occult blood should only be made when the guaiacum test is also positive.

Description of Tests.

Meyer's test.—A small piece of fæces is taken from the middle of the stool of the milk régime and made into a thick suspension by the addition, if necessary, of a little distilled water. Fill a test-tube about a third full with this fæcal suspension, add a third of its volume of glacial acetic acid, mix thoroughly for a few seconds, and boil. Then cool thoroughly under the tap. Add about 5 c.cm. of ether, and mix very thoroughly by inverting the test-tube several times. Set aside to separate. If an emulsion forms the addition of a few drops of alcohol will usually bring about a speedy separation, and the supernatant ether layer can then be pipetted off with a teat pipette into another test-tube. To the ether extract add about 1 c.cm. of Meyer's reagent by means of a clean pipette; then add a few drops of hydrogen peroxide. If blood is present there appears immediately a deep red coloration, spreading down the tube. Only an immediate and quite definite reaction is to be regarded as positive.

Weber's guaiacum test.—An ether extract is made as above. To this add about eight or ten drops of fresh tincture of guaiacum[3] and a similar quantity of hydrogen peroxide. A definitely blue coloration, appearing within two minutes, indicates the presence of blood. A greenish or bluish-green tint is to be regarded as nothing more than "suspicious."

It is wise to do the test daily over a period of several days, as the presence of blood in the stools may be intermittent.

2. *Soluble "Albumin."*[4]

German authors have shown that the presence of soluble "albumin" in the stools is always pathological in the case of adults. Normally, coagulated protein (in the protein residues of the food) may occur in the fæces; soluble "albumins" taken in the food, however, are always digested in the course of a normal "digestive journey." Even the "albumins" of intestinal exudates are digested and absorbed with comparative rapidity, and therefore if any are found in the stools the exudation must be either great in amount or not too remote from the anus. Thus, the reaction for soluble "albumin" is applicable to the fæces of an ordinary diet, though it is wiser to carry it out on the fæces of a milk régime.

The usual technique is as follows:—

Take a piece the size of a large walnut from the middle of the stool to be examined, triturate well with distilled water in a conical specimen glass[5] to make a fairly thin emulsion. If the stool is fluid a certain amount can be put straight into the conical glass. Set aside for at least an hour, and then pour off about 20 c.cm. of the supernatant fluid into a suitable vessel, centrifuge the fluid if possible, and then filter; otherwise filter through filter paper previously wetted and plugged at the point of the cone with a little Kieselguhr. Two or three filtrations will probably be necessary before a clear filtrate results, and the filtration is usually slow if the fluid has not been previously centrifuged.

Take 10 c.cm. of this clear filtrate, add 1 or 2 drops of 1 per cent. acetic acid, and if there is any turbidity cautiously add acid drop by drop until the maximum turbidity develops. Then filter until a clear filtrate results. Take some of the filtrate and boil. A heat coagulum indicates the presence of soluble "albumin."

This test is somewhat tedious, and the optimum acidity for both "neutralisation precipitate" and for heat coagulation is often troublesome to obtain. A modification which simplifies the test, and which I have tried with some convenience in a few cases, is the following:—

Take about 10 c.cm. of a fairly clear filtrate from the original fæcal emulsion and add an equal volume of a saturated solution of ammonium sulphate. Filter. The fluid filters more quickly than by the previous method. It may still be necessary to use a little Kieselguhr. Boil the filtrate, carefully adding 1 per cent. acetic acid drop by drop. A coagulum indicates the presence of soluble "albumin."[6]

B. *Clinical Findings.*

Tests for blood and soluble "albumin" have been carried out upon a series of 156 patients suffering from gastro-intestinal troubles. Not many gastric cases are included; a majority of the cases occurred in a hospital in France, of which unfortunately notes are available only in the intestinal cases. In all the cases the "albumin" was tested for by heat coagulation in the presence of acetic acid.

[1] Lyle, Curtmann, and Marshall: Journ. Biol. Chem., 1914, xix., 445. Lyle and Curtmann: Ibid., 1918, xxxiii., 1.

[2] Meyer's reagent is made up as follows: Phenolphthalein 2 g., anhydrous KOH 20 g., distilled water 100 c.cm. Dissolve and add zinc powder 10 g. Boil. The decoloration should be complete in ten minutes. If not, add cautiously a little zinc powder until decoloration is complete. Filter while hot. Keep in the dark with a little zinc powder in the bottom of the bottle.

[3] Except in laboratories, it is best to keep some guaiacum resin, and make up fresh tincture each time it is needed. This is done by dissolving a small fragment of the resin in 2 or 3 c.cm. of 90 per cent. alcohol.

[4] A more accurate term would be "coagulable protein."

[5] A "Gourmet" egg-beater is most useful for this trituration. It consists of a porcelain cylinder, into which fits the beater—a perforated disc attached at its centre to the end of a long handle.

[6] This modification, suggested to me by Professor Ramsden, lessens the sensitivity of the test by precipitating part of the coagulable protein; but in ordinary clinical work the immense saving in time and trouble probably more than compensates for this.

Summary of Results.

Blood and "Albumin" both Present.

Acute dysentery (bacillary or amœbic) and "acute enteritis"	26
Chronic gastro-enteritis in old amœbic dysentery cases— Amœbæ or cysts found 11; Not found 2	13
Ulcerative recto-sigmoiditis not included in any of above	2
Chronic diarrhœa (? bacillary dysentery)	2
Rectal carcinoma	2
"Chronic enteritis"	2
Intussusception	2
Subacute dysenteriform enteritis	1
Tuberculous sigmoiditis	1
Tuberculous enteritis	1
Pyloric ulcer	1
Amyloid degeneration of the intestine	1

Blood Present, "Albumin" Absent.

Chronic colitis (? neoplasm of splenic flexure)	1
Post dysenteric (Shiga) mucous colitis	1
Intestinal dyspepsia in old amœbic dysentery case (no amœbæ nor cysts)	1
Colospasm and chronic colitis	1
Intestinal fermentative dyspepsia	1
Duodenal ulcer	1
Pyloric ulcer	1

Blood Absent, "Albumin" Present.[*]

Sprue	1
(? tuberculous) intestinal dyspepsia and chronic colitis	1
Rectal carcinoma	1

Blood and "Albumin" both Absent.

Hyperchlorhydria	4
Pancreatic insufficiency (primary or secondary)	8
Post-dysenteric intestinal dyspepsia (bacillary or amœbic)	11
"Acute enteritis"	6
Convalescence from acute dysenteriform enteritis	4
Colospasm and mucorrhœa	4
Intestinal adhesions or kinks	8
Intestinal dyspepsia	8
Obstinate constipation	4
Chronic diarrhœa	3
Chronic appendicitis	2
Chronic (mucous) colitis	15
Chronic cholecystitis or gall-stones	14
Mesenteric hydatid cyst	1

[*] Several of the acute dysenteries of the first section under treatment arrived at a stage where they had lost a positive blood reaction, while retaining a positive reaction for albumin.

C. *Discussion.*

The significance of the finding of blood in the fæces is generally known, and little need be said here on the subject. The bleeding may have occurred at any part of the alimentary tract, and in this connexion it is important to remember that patients who use hard toothbrushes or who have a habit of sucking their gums often give the reaction for occult blood in their stools.

Another point of importance is that not all "tarry" stools indicate melæna. A stool of mucous colitis, where the mucus is intimately mixed with the fæces and coloured black with bismuth, may give the typical appearance of "melæna." Again, the intense putrefaction which occurs in certain cases of colitis may give an almost black stool, though no blood is present. On the other hand, in the canary-yellow stool of a milk régime quite appreciable amounts of blood may be distributed through it without altering the colour.

It is obvious that blood in any considerable quantity will give the reaction for soluble "albumin," unless the bleeding occurs so high up in the gut that the "albumin" is digested and absorbed before it appears in the motions. Hence the association of both "albumin" and blood in most cases which involved bleeding in the large intestine.

Soluble "albumin."—A positive reaction for soluble "albumin" is comparatively rare in any ordinary series of gastro-intestinal cases. Marcel Labbé[7] found it present in one-sixth of the cases in a series of 113 gastro-enteropaths. Goiffon[8] also found it an infrequent symptom. In this series it occurs in about one-third of the cases, the high percentage being due to the inclusion of many cases of acute dysentery from an epidemic occurring at the time. In ordinary hospital practice it is present in 7 to 10 per cent. of stools sent to our laboratory for investigation. Triboulet, Goiffon, and Labbé all found that it only occurs in grave lesions, ulcerative, inflammatory, or neoplastic, of the digestive tube; and an analysis of the cases in this series suggests the same conclusion.

In the patient with amyloid degeneration of the intestines it would appear that the presence of "albumin" was due to failure of digestion and absorption of the soluble "albumins" of the food. It could hardly be due to hurrying on of the ingested food through the gut, as "albumin" is normally absent even after violent purgatives—an interesting point which Labbé develops when he shows that the presence in the fæces of undigested foodstuffs, especially muscle fibres, without soluble "albumin," may indicate an accelerated "digestive journey"; but if in addition to undigested foodstuffs soluble "albumin" is present there is some grave lesion of the digestive tube, such as occurred, for example, in one of the patients above, who had a mucous colitis associated with a digestive insufficiency secondary to tuberculous enteritis.

In the other cases in which both *blood and "albumin"* were present there was either bleeding or ulceration, or both, of the intestinal tract. Apart from two cases of intussusception, three of chronic enteritis (one tuberculous), and one case of a large eroding pyloric ulcer, these were patients in whom the large intestine was involved, and in many of them definite recto-sigmoidal ulceration was seen by recto-sigmoidoscopy.

Blood present, "albumin" absent (7 cases).—In such cases either the bleeding is small, if it be in the large intestine and there is no serious ulceration, or it is far enough away from the anus for the blood "albumins" to be digested and absorbed, as, for example, in cases of pyloric and duodenal ulcers.[9]

Blood absent, "albumin" present (3 cases).—In the case of sprue, the food "albumins" are probably neither digested nor absorbed. The second case was a probable tuberculous enteritis, and the third a rectal carcinoma. Here there was no bleeding, but a sero-albuminous exudation from the ulcerated surface. In addition to these, it was possible in some of the cases of acute dysentery, especially the amœbic dysenteries, to follow their progress under treatment both by means of the investigation of their stools and by direct examination by the recto-sigmoidoscope.

In the acute stage there was marked inflammation, going on to ulceration and hæmorrhage, with "albumin" and blood present. As improvement occurred, the bleeding ceased, leaving still a serous exudation from the ulcerated intestinal wall. Now "albumin" only was present, blood absent; and at the same time the corresponding changes in the ulcers themselves were followed from day to day by the recto-sigmoidoscope. A similar process of exudation without bleeding may occur in rectal carcinoma.

Both "albumin" and blood absent (92 cases).—In the great majority it would appear that there was a disturbance of function rather than any actual ulcerative lesion. Even in the cases of acute enteritis in this section it was specially noted that the general condition was well maintained, and this in spite of there being 20 stools a day in some of the cases. The toxæmia so typical of acute ulcerative conditions of the bowel was absent. Some of the patients in this section were treated for acute conditions such as bacillary dysentery, recovered, and months later came into hospital, free now from any evidence of ulceration of the gut, but suffering from extremely persistent functional troubles,[10] dependent perhaps upon extensive changes in the mucosa, or maybe in the intestinal nerve plexuses, as Loeper has suggested.[11] In such cases blood and "albumin" are consistently absent.

Position of Lesion.

The finding of blood or "albumin" in the stools does not afford definite evidence of the position of the lesion, and a further simple procedure may show whether it is in the large intestine or not.

The bowel is well emptied by means of an enema, and half an hour later the large intestine is given a lavage of about a litre of normal saline, introduced at body-heat. In acute cases, or in certain recto-sigmoidal ulcerations, a lavage of even 500 c.cm. may be more than sufficient to cause intense pain, and one must be guided by the patient's toleration in deciding how much fluid to introduce. The lavage must be given slowly and at a very small positive pressure, and must be retained as long as possible, up to a period of half an hour. On the fairly clear fluid so obtained the tests for blood and "albumin" are carried out. (The cytology of a centrifuged specimen of the fluid is investigated at the same time.)

[7] Labbé and Canat: Presse Médicale, Sept. 26th, 1918.
[8] Goiffon: Presse Médicale, May 2nd, 1918.

[9] In cases where there is slight bleeding in the large intestine it is possible that a positive blood and a negative "albumin" test may be given because the test for blood is the more sensitive.
[10] Joltrain, Baufle, and Coope: THE LANCET, May 31st, 1919, p. 933.
[11] Loeper: Journ. Méd. Français, November, 1919.

In this way light may be thrown upon the condition of the large intestine.

Conclusions.

1. Examinations of fæces for blood are fallacious unless previous dieting and drugs have been suitably regulated.
2. The test for soluble "albumin" in the fæces is probably even more important than that for blood (though both taken together are specially valuable); it indicates either failure of digestion and absorption of food "albumin" (a very rare condition), or the existence either of hæmorrhage or ulceration of the gut. It is almost always associated with some serious condition.
3. The presence of both "albumin" and blood in the stools indicates (*a*) hæmorrhage with or without ulceration not very remote from the anus, or (*b*) a severe hæmorrhage higher up the gut.
4. The presence of blood alone indicates hæmorrhage. The nearer the bleeding is to the anus, the less significance it has.
5. The presence of "albumin" alone usually indicates serous exudation, without bleeding, probably near the anus, and presumably the further the lesion from the anus, the larger the exudation must have been. More rarely it indicates a failure of digestion and to absorption of food "albumins."
6. Lavage of the large intestine, and investigation of the fluid so obtained, often gives valuable help in localising a gastro-intestinal lesion.

OBSERVATIONS ON TWO ACTIONS OF ALCOHOL.

BY W. BURRIDGE, M.A., M.B., B.CH. OXF.

THE older physicians prescribed alcohol without misgivings, and never found cause to doubt they were doing what was best for their patients. But their course of action has not hitherto been justified by experiments conducted in the laboratory, so that the modern physicians of necessity prescribe alcohol with an element of uncertainty. Any observations assisting them should therefore be of practical value.

Limitations of Previous Experimental Methods.

As a preliminary some possible limitations to the usual experimental method may be considered. One aim in experimental work is to obtain fixed conditions which, in the case of the heart, means perfusing that organ with some modification of Ringer's solution. The inquirer who went into any laboratory where such experiments were in progress would find the experimenter using the best possible solution for the work, and using only that solution. If he pursued his inquiries further he would find different experimenters using different "best" solutions, but each always keeping to that one he thinks best. If the action of a drug be the same under all conditions an experiment conducted under fixed conditions will give accurate and correct general results. But if the expression of the action of a drug differs under different experimental conditions, an experiment conducted under fixed conditions will give only particular results. I have found that the expression of the action of alcohol definitely differs under different experimental conditions. This is especially the case when small amounts of the substance are used. Under the usual laboratory conditions alcohol in small amounts acts, if at all, as a depressant. But under different conditions it definitely augments cardiac activity.

We will consider first the action of 40 per cent. alcohol on the frog's heart. This strength is well outside the limits employed by any other experimenter, and more than one physiologist has come to me in the laboratory and expressed doubts as to the capacity of a heart to survive exposure to it. With the alcohol and the heart at hand there was no difficulty in making a convert. When I used it first I had no doubt I was using a cardiac depressant, and also that it ought to damage the heart. But certain of the facts observed did not fall directly under those headings. The heart stopped in a more or less contracted condition, and after removal of the alcohol the beats were greater in amplitude than they had been before. To bring that increase of contraction within the scope of a theory of damage or depression was difficult, but it was done.[1] Such a theory, however, cannot include the additional facts following. A heart was used for experiments on the variations in the refractory period produced by this strength of alcohol. It was briefly exposed to the drug and then the disturbance so set up examined. When that disturbance had subsided the heart was briefly exposed to the alcohol again, and so a fresh disturbance set up. Thirty such disturbances were set up and the experiments lasted over two working days. On the third day the heart was still capable of activity though evidently failing. On the fourth day activity was still possible, but later ceased. The point for consideration about these experiments is that no simply perfused frog's heart has survived so long. These facts cannot be brought within the scope of a theory that the alcohol was only a depressant or that it did damage, but on the contrary. After that result one naturally turned to a re-examination of the older records showing the augmentation after the alcohol. The re-examination was greatly assisted by the discovery of a method for ascertaining the maximum contractility of the hearts on which the older experiments had been made. It was thereby found that the old experiments had been performed on hearts that were beating nearly at their maximum. They had little scope for expressing augmentation as improved contraction only, but they showed all they could. In this connexion it is as well to point out that experimenters do not in general know the capacity of the hearts on which they work. It is assumed, but not known, that the heart beats well at the start and that a deviation from that in one direction means better, and in another worse. When the maximum contraction is known it is also known whether a good or bad start was made, whether a heart is beating well or bad at a given moment and by how much, and also the activity becomes directly comparable with that of another heart.

A New Method of Approach.

Having thereby found that the hearts on which the original experiments were made had little scope for showing an augmentation of contraction, attempts were made to give that scope. Instead of letting the cardiac machine run approximately "all out," measures were taken to run the machine at about half power. Then an apparently different result was obtained. Instead of observing a *slight* increase of contraction after the heart had been treated with the alcohol a *great* increase was observed—as much as 100 per cent. The differences depended on possibilities. For if the machine at the start were running at 90 per cent. of its maximum, an approximately 11 per cent. increase reaches that maximum. But if at the start it were running at 50 per cent. of its maximum, a 100 per cent. increase on this reached the maximum. After treatment with 40 per cent. alcohol the heart beats at its maximum. If it were beating at 90 per cent. to begin with only 11 per cent. could thereby be added; if it were beating at 50 per cent. at the start that amplitude could be doubled, and was. In presence of the alcohol the action observed was primarily that of depression. The heart stopped and became electrically inexcitable. It stopped in a more or less contracted condition, that contracture being the only visible evidence of any augmentation at this stage. After washing away the alcohol its depression went also, and it was after this that augmentation was definitely manifest. The underlying cardiac change developed by the alcohol, and responsible for this augmentation of contraction, persisted after removal of the alcohol from the heart. It was a slowly subsiding change, and in about 20 minutes or so the heart returned to the *status quo ante*. This strength of alcohol, then, exerts two definite actions on the heart.

There is a depressing action coming on and going away concomitantly with the drug; there is an augmenting

action showing a capacity for persistence after removal of its producer. The finding of that augmentation was entirely contrary to my expectations. When alcohol was first pushed in this manner it was done with a view to obtaining an advanced grade of depression. The depression was obtained, of course, but it was also found to be always accompanied by an advanced grade of augmentation. The two changes had different modes of subsidence which made possible their separation and identification. Having thus found that 40 per cent. alcohol *always* produced two cardiac changes, the hearts were thereafter exposed to gradually lessened strengths of the drug. Except as mentioned below, the same two actions were found. There was a depressing action coming and going concomitantly with the alcohol, there was an augmenting action showing that capacity for persistence. But on making comparison between the members of the series of experiments carried out with concentrations of alcohol varying from 0·5 per cent. to 40 per cent. there could be appreciated the existence of a definite time factor in the development of the stimulating action. The rate of development increased as the strength of alcohol was increased. With 40 per cent. alcohol a high grade of augmentation was produced in a few seconds; with 1 per cent. alcohol a lesser grade took many minutes. No such differences were observed in the rate of subsidence of the change, once it had been produced. This stimulating action of alcohol in low concentrations has been observed by W. E. Dixon[3] and F. Ransom,[4] but its significance missed. The former though the alcohol was being metabolised, the latter that the heart was acquiring "tolerance." I do not think Dixon would suggest the phenomena observed after 40 per cent. alcohol were a result of metabolism or Ransom that they were acquired tolerance. But those phenomena are only a higher grade of the phenomena they observed and so described. Neither of these observers noted the capacity for persistence of this change, nor that when it was present the cardiac refractory period was shortened.

Profound Influence of Two Factors.

The action on the heart of low concentrations of alcohol is, however, profoundly influenced by two factors not taken into account by other experimenters. The factors modifying this action are: (1) The calcium content of the perfusing solution; (2) the amplitude at which the heart is beating. When hearts beat nearly at their maximum and were perfused with a solution of relatively high calcium content—the normal laboratory conditions—small doses of alcohol (2 per cent. or less) either exerted no appreciable action or only depressed—e.g., 1 per cent. alcohol had no appreciable action, 2 per cent. slightly depressed. When hearts beat at about half their maximum and were perfused with a solution of relatively low calcium content so little as 0·5 per cent. alcohol markedly influenced cardiac activity. There was a definite though small depressing action, succeeded by an augmentation much greater than that original depression; 1 per cent. alcohol gave as much as 100 per cent. increase. Under differing experimental conditions the action of alcohol thus also differed. Those giving a positive result had obviously the greater value. Under these latter conditions the action of 0·5 per cent. alcohol differs only quantitatively from that of 40 per cent., whereas under the others there is also a qualitative difference. Calcium is chiefly responsible for the differences.[2] This element exerts two actions on the heart. Before alcohol can depress it has to overcome the one action of calcium; and before it can augment it has to overcome the other. The more the calcium in the perfusing solution the less readily does the heart react to alcohol.[2] Ringer's solution has a greater calcium tension than has blood, the latter containing substances such as adrenin, which enable the heart to function in presence of much less calcium than would otherwise be necessary. This greater calcium tension of Ringer's solution confers on the perfused heart a lessened capacity for change which, unless taken into consideration, can vitiate the conclusions drawn from our experiments. It can directly alter the expression of the action of a drug. The normal heart is bathed in a solution of low calcium tension. If, in addition, it beats at less than its maximum we have the combination of circumstances under which small amounts of alcohol exert a stimulating action far greater than their concomitant depression. Those who employed it directly under those conditions are justified. But alcohol is a substance that cannot be pushed because its depressing action increases more rapidly than the augmenting. It is only when the drug is used in small concentration that augmentation outweighs depression. Those who prescribe repeated small doses do right.

Summary.

1. Alcohol exerts two actions on the heart: (*a*) A depressing action coming on and disappearing concomitantly with the drug; (*b*) an augmenting action showing a variable rate of development depending on concentration, and especially a capacity for persistence after removal of its producer.

2. With increase of concentration the two actions do not increase at equal rates, depression increasing faster than augmentation.

3. Low concentrations of alcohol under the experimental conditions specified exert a stimulating action far greater than their concomitant depression.

References.

1. Burridge: Quart. Journ. of Exp. Physiol., p. 145, 1913.
2. Burridge: Quart. Journ. of Med., x., p. 141, 1917.
3. W. E. Dixon: Journ. of Physiol., xxxviii., p. 346, 1907.
4. F. Ransom: Ibid., liii., p. 141, 1919.

Clinical Notes:

MEDICAL, SURGICAL, OBSTETRICAL, AND THERAPEUTICAL.

A CASE ILLUSTRATING

RE-FORMATION OF ELBOW-JOINT

AFTER GUNSHOT FRACTURE AND EXTENSIVE LOSS OF BONE.

BY WINIFRED F. BUCKLEY, O.B.E., M.R.C.S. ENG.,
LATE RESIDENT MEDICAL OFFICER, ENDELL-STREET MILITARY HOSPITAL.

I HAVE recently followed the whole history of a case in which, after gunshot injury of the left elbow-joint with fracture of the humerus and extensive loss of bone, the joint was ultimately re-formed. The notes are briefly as follows.

Private S., aged 38, was wounded on July 23rd, 1916, and admitted to the Endell-street Military Hospital on August 16th. On admission he had very septic gunshot wounds of the left elbow-joint with much swelling and œdema. The X ray plate showed a supracondylar fracture of the humerus with the lower fragment projecting obliquely forwards, its articular surface being dislocated from the head of the olecranon and radius.

On August 29th an operation was performed for the removal of the separated lower end of the humerus which was located in the joint. The inflammation did not subside for three months and there was very little movement of the joint on his discharge in December, 1916.

As he continued to attend at the out-patient pensioners' department, we were able to take a series of X ray plates, here reproduced, of the joint over a period of three years, and these are remarkably interesting in showing a steady growth downwards of the lower end of the humerus towards the ulna and an actual re-formation of the joint, with hardening and rounding off of the lower end of the humerus on the inner side to fit into the cavity of the ulna. The downward growth of bone continued for two years, the new joint forming during the third year.

The photograph shows the patient's present range of movement. The left arm is two inches shorter than the right, the forearm is fixed in a position of semi-pronation, and there is some weakness of the muscles supplied by the musculo-spiral nerve which is improving under treatment. Otherwise good muscular power is present.

Illustrating Dr. Winifred F. Buckley's Case of Re-formation of Elbow-joint.

FIG. 1.

Gunshot wound of the left elbow; radiogram taken on Sept. 18th, 1916, showing the condition after removal of the lower end of the fractured humerus.

FIG. 2.

Radiogram takenton Jan. 19th, 1918, showing downgrowth of the humerus towards the ulna.

FIG. 3.

Radiogram taken on June 23rd, 1919, showing re-formation of elbow-joint.

FIG. 4.

Photograph taken on August 10th, 1919, to show range of movement at elbow-joint; the tracing is made from a second photograph superimposed on the first.

EPILEPTIFORM FITS AND COMA IN SYPHILIS.

BY C. H. SAVORY, B.A. CANTAB., M.R.C.S. ENG.

WITH reference to the recent discussions upon this subject and the article by Surgeon Lieutenant-Commander F. G. Hitch in THE LANCET,[1] the following notes may be of some interest. They all came under my notice between November, 1918, and May, 1919.

CASE 1.—A. B., Private, R.M.L.I., aged 25, contracted syphilis in April, 1918. Wassermann ++++. Treatment consisted of galyl, nine injections, 0·3 g. each, and mercurial inunctions—ung. hydrarg. 3i. daily. He had had no active signs for six months, but on 10/12/18 he had two typical "epileptiform" fits at 6 A.M. and 10.30 A.M., the latter of which I witnessed. Clinically, it was a typical epileptic fit. But there was no history of previous fits or family history of epilepsy, neither was there any premonitory symptoms or aura. Bromides were administered, but in spite of this the patient had two more fits.

17/12/18: Wassermann was +++, and it was then suspected that the fits might possibly be specific. Bromides were stopped and large and increasing doses of pot. iodide administered, which resulted in a rapid improvement, headaches being the only symptom. In three weeks there were no symptoms, and another course of six galyls was given with no reaction in any case.

28/1/19: Patient was discharged to duty with no symptoms, and apparently fit in every way.

CASE 2.—C. D., aged 27, leading stoker, contracted syphilis in December, 1918.

6/12/18: Wassermann +++. Treatment consisted of three galyls (0·25 g.) and ung. hydrarg. 3i. daily as inunctions.

17/12/18: Three typical "epileptic" fits in four hours. No previous or family history of epilepsy. No aura to fits. After the fits there was intense headache and the patient was very dazed and drowsy, lethargic, and torpid.

18/12/18: Lumbar puncture performed and 15 c.cm. fluid withdrawn under very increased pressure. Pot. iod. administered in large and increasing doses.

Result.—Complete recovery in three days and interrupted galyl course was resumed in seven days. Examination of C.-S.F. showed: Wassermann, negative; cells, none seen; globulin, absent.

CASE 3.—E. F., aged 19, Private, R.M.L.I., contracted syphilis in September, 1918.

Treatment.—Four galyls (0·25 g.), fourth being given on 18/2/19.

19/2/19: Fifteen hours after galyl patient had three consecutive fits in 40 minutes, and hyoscine hydrobrom., gr. 1/200, was given hypodermically owing to their severity. No history of family or previous fits. After fits condition very torpid, dull, and dazed, and acute headache. Lumbar puncture performed immediately, and 10 c.cm. fluid withdrawn under increased pressure. Examination of fluid showed: Wassermann, negative; cells, none seen; globulin, not present. Wassermann of blood +++. In 48 hours complete recovery, and fifth and sixth galyls were given on 25/2/19 and 4/3/19, with no reaction in either case.

CASE 4.—G. H., aged 40, A.B., contracted syphilis in 1909.

Treatment.—Three "606" and two years intermittently with mercury. No treatment since 1911. Admitted with gumma of inner end of left clavicle and a history of fits in last six months, tinnitus, headache, and of being "strange in his manner." Pot. iod. and galyl were given and the gumma cleared up.

24/1/19: Lumbar puncture performed and about 25 c.cm. fluid withdrawn under very marked increased pressure. Relief was apparent in 24 hours.

29/1/19: He was discharged to duty with no symptoms, and his manner and behaviour were markedly brighter and more alert. In this case I witnessed no fits, but there was a definite history of them and no epileptic history. C.-S.F. examination was again normal, with Wassermann negative; Wassermann of blood being ++++. Urine normal.

Conclusions.

These cases give rise to the following possibilities:—

1. Epileptiform fits in syphilis may not be so uncommon as is commonly thought, and may be an early manifestation.

2. Cases of "epilepsy" suddenly occurring in adults, when there is no previous or family history of epilepsy, might with advantage be investigated for syphilis.

I should like to emphasise the rapid relief apparent after early lumbar puncture and allowing cerebro-spinal fluid to come away until it flowed at a normal rate. Pot. iod. also appeared to assist matters very considerably.

OPIUM IN ACUTE DILATATION OF THE HEART.

BY JAMES T. R. DAVISON, M.D.

IN the following case of aortic regurgitation compensation had been established for several years, but was temporarily lost owing to an extraordinary physical effort. The patient's condition was made worse by taking a glass of milk when in an acutely exhausted state. As a consequence the myocardium gave way and extreme dilatation supervened.

Margaret G., 20 years of age, had rheumatic fever five years ago. When at school her companions had noticed that, on running, an episternal pulsation appeared on her neck. She had never suffered from fatigue but occasionally from palpitation.

On Jan. 24th of this year, being at the seaside, she rapidly ascended 140 steps in a lighthouse. She became very tired, and on the way to the hotel drank a glass of milk. On arriving at the hotel she was seized with an attack of palpitation, accompanied by a feeling of extreme prostration. Next day the temperature rose to 102° F.; the pulse became so quick that it could not be counted. The temperature descended somewhat later on, but the prostration and rapidity of the pulse remained as before. Hypodermic injections of camphorated oil, digitalin, and oxygen inhalations were administered. As she continued in the same state for three days she was brought by train to Buenos Aires. I saw her at midday on the 28th, and found her in a state of extreme prostration. She had air hunger; the pulse was regular, over 200 per minute; enormous dullness over the heart; cardiac impulse extended outside the mammillary line; coughed slightly, and had had a little hæmoptysis in the morning. I gave her a hypodermic injection of camphorated oil. At midnight no change; another injection of oil, and 15 drops of digalen by the mouth. Next morning I found her in the same condition; the day before she had taken a small glass of milk, which had caused a great deal of pain and discomfort; she had not slept for several days. Her state was now very alarming, and as her heart might become exhausted at any moment and cease to contract I determined to administer a hypodermic injection of one-fifth of a grain of omnopon (a remedy which contains all the essentials of opium); at the same time I gave her another injection of camphorated oil and 15 drops of digalen by the mouth. As food she was only allowed sugared water and weak broth. I saw her again in the afternoon and found that she had slept three hours and the pulse had come down from 224 to 210. I gave more digalen and another injection of oil. At midnight I found her completely changed. The pulse had dropped from 210 to 110; she had slept several hours and felt quite happy and contented. Another injection of camphorated oil was administered. On my visit the next morning the report was that she had slept all night. On examining her heart I heard a diastolic murmur in all the areas, with maximum intensity over the upper part of the sternum; a systolic murmur all over the sternum. A later examination of the urine revealed the presence of albumin and of hyaline casts.

Remarks.

In this case the strain on the heart involved in the great effort of ascending rapidly a heavy flight of steps had weakened the myocardium. As a consequence the sympathetic had come to the rescue, and by accelerating the cardiac contractions had essayed to neutralise the depressing effects of the weakened muscle. But, as sometimes happens in the working of the mechanisms designed to direct and protect the organ, the parts are not always well adjusted, and the effects, far from saving the organ, may actually lead to its death. Since opium is supposed to hinder somewhat the synapsis between neurons, I administered omnopon in the hope of separating the corresponding neurons, and thus impede too rapid passage of nerve force along the fibrils.

I tried to give the heart absolute rest so that the myocardium might recuperate its vigour, and so I recommended the patient to remain in bed for a long time. As she felt so well she would not take my advice and got up and went about as usual. I essayed at first to reduce the rapidity of the contractions by means of digitalin, but I soon gave up the treatment, having obtained no practical results; besides that I am loth to interfere directly with the myocardium unless there is rupture of compensation. I preferred to strengthen the heart indirectly by administering arsenic and hypophosphites. I must add that after a time the cardiac dullness was much reduced. I saw this patient three months afterwards and she reported that she felt as well as she ever had done before her sudden illness and that her pulse ranged between 80 and 90.

Buenos Aires.

A SITE near Nel's Poort, Cape Province, is being selected for the contemplated Cape Provincial tuberculosis colony. It is stated to possess all the requisite advantages for such a settlement.

NATIONAL HOSPITAL, QUEEN-SQUARE, LONDON.—Thanks to an emergency grant of £4000 from King Edward's Hospital Fund for London and an extension of the principle of payment by patients, the hospital is again able to maintain the greater part of the work of the institution. It was feared at one time that the whole of the hospital would have to be closed; this catastrophe has been averted, but three wards nevertheless remain unoccupied pending the receipt of increased monetary assistance.

[1] THE LANCET, 1920, i., 1311.

Reviews and Notices of Books.

THE INDUSTRIAL CLINIC.

A Handbook Dealing with Health in Work. By Several Writers. Edited by EDGAR L. COLLIS, M.D. Oxon., M.R.C.P., Talbot Professor of Preventive Medicine in the University of Wales. London: John Bale, Sons, and Danielsson, Ltd. 1920. Pp. 240. 10*s.* 6*d.*

THE appearance of this book is an indication of a growing interest in preventive medicine, which some years ago touched the individual at few points only, but whose influence now begins with, or even before, birth and is continued to the grave. A realisation of the place which industrial medicine should occupy in industrial administration has been quickened by the experiences of the last few years; but success in its application depends to a great extent upon the benevolence of the worker, and this benevolence will hardly be accorded until the worker is sufficiently educated to appreciate its importance, an event that may be regarded as one of the benefits to be expected from an advance of true education. Educational policy has not always gone along lines calculated to promote such appreciation. Instruction has often taken the place of education, and not infrequently imagination has been killed instead of being stimulated. In the future the one result will be gained or the other, according to the type of teacher chosen. In the past the teacher of youth has often been a man not only himself incapable of teaching but incapable of learning also.

In the present volume we find grouped a series of contributions from men who have devoted years to their subjects or who have been drawn towards them by recent necessities, and have entirely different outlooks. The first chapter is contributed by Dr. W. F. Dearden, certifying surgeon for Manchester and medical officer of health for the Port of Manchester. This forms an excellent introduction to the medical examination of the worker, and pays especial attention to the examination required for the granting of certificates of fitness for factory workers under 16 years of age and the examination of all workers required by special rules or regulations governing dangerous industries. The material is plainly put forward, and is the result of ripe experience. Those who have had opportunities of observation similar to those of Dr. Dearden will agree with many of his strictures—e.g., upon the sanitary accommodation in many factories—and can only regret that the comment that "the surgeon can do nothing practical towards ameliorating unsatisfactory conditions" is still true. The same may be said of the statement that in the case of personal hygiene "the surgeon can do nothing beyond giving good advice."

The second chapter is written by B. Muscio, M.A., and it is a sign of the times to find a psychologist collaborating in the production of a book on medicine. The subject treated, "Choosing the Worker," has a greater importance in medicine than is yet realised; the degree to which a worker fits his environment may be determined largely by selection, while environment in its turn has much to do with his efficiency. No doubt the health of the working population will be vastly improved when periodic examination—psychological and medical—makes it impossible for a worker to remain unknowingly in an occupation for which he is unfitted.

Chapter III., on Industrial Efficiency and Fatigue, has been entrusted to Dr. H. M. Vernon, who is now an investigator to the Fatigue Research Board. This is one of the most difficult sections of the book. The subject is little understood, and, whilst a scientific treatment is demanded, no satisfactory definition of the condition itself is as yet universally accepted. A similar uncertainty may be said to exist with regard to the tests to be used. Dr. Vernon says: "The identification and measurement of the condition of industrial fatigue is by no means an easy one, and the most reliable test at present available is that of output." Everyone will recognise the difficulty referred to in the first part of this sentence; those best qualified to judge will perhaps hesitate to accept the statement contained in the second. To measure the condition of a couple of workers with regard to industrial fatigue and to compare the two is very difficult; but to compare the condition of the same worker with regard to industrial fatigue at different times is comparatively easy, though the test employed would not as a rule be that of output, for this is much influenced by circumstances beyond control and often becomes entirely unreliable. Dr. Vernon truly says, "It by no means follows that a fall of output necessarily implies the existence of fatigue." Conversely, it by no means follows that fatigue is absent when output is maintained. It may be true, as Dr. Vernon states, that, where repetition work was the rule, such conditions as character of the article made, quality of material, nature and speed of machinery remained absolutely unchanged for two years or more; but it can hardly have been strictly true that "the only alteration of conditions was in the hours of labour." There are conditions of importance besides those mentioned, some of which could scarcely have remained unchanged for the time described. The difficulty of making an accurate determination of industrial fatigue with the methods at present available is very great, but this fact ought to make us all the more careful in excluding every possible source of error. The statement that output is the most reliable test of fatigue has been made previously, but instances given in this article lend little support to such a view. Remarks on the avoidance of industrial fatigue, the length of the working day, overtime, and length of spells, may be commended, though one feels that here is an attempt to treat an extensive subject in an altogether inadequate space, and the object of the particular type of book we are dealing with has been missed. It is to be hoped that more ample space will be allocated to these subjects in the future.

With regard to time and motion study it is true that the former originated with Dr. F. Taylor, but motion study in the fullest sense originated with Gilbreth. Gilbreth's name is mentioned in connexion with the comfort of the worker, and his "fatigue study" is referred to in the literature, but no reference is made to him as the great exponent of motion study, in which he has worked so long, and upon which so much of his reputation rests. Dr. Vernon believes that time and motion study as a part of scientific management "enforces over-pressure on the workers." But, surely, it is clear that the workers can work at high speed, or rather with high production and without extra fatigue, if unnecessary movements (which are often actually more numerous than the necessary movements in any particular operation) are eliminated. It is owing to the seeming impossibility of getting this fundamental fact understood that so little progress has been made.

Chapter IV., on the Hygiene of Working Conditions, is adequately treated by Dr. Greenwood, the sections on ventilation being likely to be especially helpful. It is to be regretted that the Fahrenheit scale and the English weights and measures must still be employed. The section on Lighting also is treated in a simple and adequate manner, taking account of the class of person likely to use the book. Cleanliness is perhaps one of the most important points to stress at the present time. "Factories must be kept in a cleanly state"; but how many occupiers are capable of understanding (*a*) exactly what this means and (*b*) the methods to be adopted to secure it? More attention paid to this particular matter would soon show a result in greater fitness and content and better output amongst the workers. It is very true that "disinfectants can never replace vigorous scrubbing, free ventilation, and sunlight."

In this section, as indeed is the case with others also, the impression is given of undue condensation, and in future editions it would probably be wise to encourage contributors to give rather more detail, even if this should involve omitting certain parts of their subjects.

Chapter V., on the Hygiene of the Individual, is written by Lucy Cripps, M.B. Here signs of undue preparation are obvious, but other criticisms must be offered. If the statement "the frequency of washing and shampooing the hair depends on the rapidity with which dandruff accumulates" were true, fewer dirty heads would be encountered. And are we really wiser for being told that "the hygiene of the auditory canal is special"? There is truth in the sentence, "Insufficient mastication (these hurried times) is often the main cause of indigestion," but is this the best way of stating it? And would it not be better to leave out dietetics altogether than to attempt to treat such a subject in 24 lines? Throughout the section there are signs of haste, and even of carelessness. We are surprised to learn that "scientific management is doing much to unite labour and capital." One reproach often brought against scientific management is that when introduced in the usual manner it leads to endless difficulties between capital and labour.

The remaining chapters on Food Values in Relation to Occupation, by Dr. Leonard Hill; on Food at the Works, by M. J. Hall, O.B.E.; the Ambulance Room, by Miss J. F. O'Brien; and the Industrial Employment of Women, by Dr. H. B. Adamson, appear to be excellently adapted to the needs of the persons into whose hands the book is likely to fall. Sympathy with, and experience of, the real needs of the factory worker are evidently the possession of those dealing with the sections on factory organisation; without these qualities any endeavour to teach others will always be futile.

We may congratulate Dr. Collis on his attempt to fill a difficult position, but at the same time we would warn him that to secure a real success he must be prepared to scrutinise more carefully the contributions to a second edition.

A MANUAL OF OBSTETRICS.

By JOHN COOKE HIRST, M.D., Associate in Obstetrics, School of Medicine, University of Pennsylvania, &c. With 216 illustrations. London and Philadelphia: W. B. Saunders Co. 1919. Pp. 516. 14*s*.

THIS work is intended as a companion to the author's "Manual of Gynæcology," and includes the methods of teaching he has employed for the last 20 years. It is interesting as illustrating the modern methods of dealing, in vogue in the States at the present time, with various of the complications of midwifery, and those methods differ from the ones prevalent with us in many particulars, it would seem.

Little embryology is given, but we notice a very old-fashioned account of the development of the amnion. We cannot agree that the attendant on a primipara should wait to rupture the membranes until they appear at the vulva, and it is, of course, only one membrane in such cases that requires rupture. In unreduced occipito-posterior presentations the author favours rotation with forceps, or even using the forceps as a lever to pry the head round; this is quite contrary to English teaching. In the treatment of an incarcerated retroverted uterus we are told that abdominal section or the induction of abortion is indicated; the author does not seem to know that if left alone the uterus will right itself in the vast majority of the cases. The section on the measurement of the pelvis is good, and the ingenious method of determining the index of the outlet devised by Dr. Daniels is quoted. It is interesting to note the recommendation of plugging for placenta prævia, and the statement that the vaginal pack is useless in controlling accidental hæmorrhage. The results obtained at the Rotunda by this method should be consulted by the author before condemning it so forcibly. The statement that a Champetier de Ribes bag has a limit of dilatation greater than the normal complete dilatation is not correct of the bag of proper size as designed by Champetier de Ribes, but unfortunately many faulty patterns are on the market. We cannot agree with the condemnation of the axis traction forceps and the suggestion that two pairs of forceps should be carried, a straight pair for use at the outlet and a Simpson's pair for general use, surely an unnecessary addition to the midwifery bag. The description of the Mauriceau method of delivering the child in a breech presentation does not correspond to that generally given in English text-books, and the omission to state that the traction should be made upon the shoulders seems to us greatly to impair its utility.

The book is well written and contains a great deal of interesting information, but, as we have pointed out, much of it is not in accord with the teaching current in this country.

THE TREATMENT OF SYPHILIS.

By Dr. H. S. BAKETEL. London and New York: Macmillan and Co. 1920. Pp. 167. 13*s*.

IN this work the author pays special attention to the technique of salvarsan injections. The standard he insists on is a very high one, and one which is only too frequently missed. Against this tendency to adopt slipshod and careless methods, especially in the use of the soluble salvarsan preparations, the author utters a very emphatic word of protest. In the earlier chapters the history and chemistry of salvarsan are summarised. Sufficient information is given to permit of the reader forming some idea of the process employed in its manufacture and of the steps which led to the ultimate discovery of arsphenamine. The use of intramuscular and subcutaneous injections of neoarsphenamine is fully dealt with, and the same conclusions apparently arrived at as those held on this side of the Atlantic. Although the excellence of the therapeutic results obtained from such medication is fully recognised, no sure means have yet been devised for the elimination of the attendant pain.

Dr. Baketel is an advocate of the use of very large doses of potassium iodide and of equally heroic injections of bichloride of mercury. In the case of the latter drug he recommends injections of ¼ to 1 gr. doses every other day. Although the possibility of nephritis is admitted, the author has never experienced ill-effects amongst his own patients. In the last few chapters the subjects of neuro-syphilis and of congenital syphilis come under discussion. The final chapter deals with the standard of cure. Altogether the subject of the treatment of syphilis is handled in a remarkably complete manner. The book is well arranged, the illustrations do much to assist the reader in understanding the technique advocated, and the work should furnish a guide to those who have a limited knowledge of the technique and of the "why, when, and how" of intravenous medication.

THE SOCIAL DISEASES.

By Dr. J. HÉRICOURT. Translated, and with a final Chapter by BERNARD MIALL. London: George Routledge and Sons, Ltd. New York: E. P. Dutton and Co. 1920. Pp. x. + 246. 7*s*. 6*d*.

IN the preface to this book Dr. Héricourt states that just as the animals are prone to various diseases, so human societies may suffer from sickness, and as there is a social physiology there is also a social pathology. This social pathology, according to the author, consists of four diseases—tuberculosis, syphilis, alcoholism, and sterility. His book was evidently written originally for the French public, and its outlook is necessarily French. Starting from the standpoint that "societies, like men, are the architects of their own misfortunes," Dr. Héricourt proceeds to point to the remedies. These are based in several instances on statistical data of a startling character, but we find the pathological dicta by which they are supported hardly such as would satisfy a British pathologist. As it stands, the book is a severe indictment of modern civilisation, and the final chapter by the translator, on Social Maladies in England, is a no less lurid account of our national shortcomings. While sympathising with the obviously good intention of the indictment the thoughtful reader gains an impression that the whole story is out of proportion, and that there in another side—a saner, soberer, healthier side—of human nature, which is not included in this estimate of the world's social diseases.

A MANUAL FOR MIDWIVES.

By C. NEPEAN LONGRIDGE, M.D., F.R.C.S., M.R.C.P., and J. B. BANISTER, M.A., M.D., B.C., M.R.C.P., F.R.C.S. Third edition. With 51 illustrations. London: J. and A. Churchill. 1920. Pp. 346. 7*s.* 6*d.*

THE authors have amplified and revised the third edition of this well-known work. The book is a good one of its kind, well balanced, and striking the happy mean so necessary in a work intended for midwives only. Its utility is much increased by the appendices, which include the rules of the Central Midwives Board, and the very useful series of leaflets from the pen of the chairman, Sir Francis Champneys, which deal with ophthalmia neonatorum, gonorrhœa, syphilis, cancer of the uterus, and cancer of the breast. This is a most valuable series, issued at the request of the Board, and for distribution among the laity as well as midwives. There is also an appendix by Mr. Sydney Stephenson, dealing with the care of the eyes during and after birth. We can strongly recommend this book to pupil midwives and their teachers.

BAILLIÈRE'S NURSES' COMPLETE MEDICAL DICTIONARY.

Edited by CONSTANCE M. DOUTHWAITE, Member of the League of Nurses of St. Bartholomew's Hospital, London. Second edition. London: Baillière, Tindall, and Cox. 1920. Pp. 206. 3*s.*

THIS is a good dictionary for its purpose. The definitions are crisp and served in agreeable literary form. Names are spelled with remarkable accuracy, except for a certain hesitation, all too common elsewhere, over the possessive case of the famous Robert James Graves. The dictionary can be cordially recommended to nurses and others who require a small book of ready reference on medical and allied scientific terms. The price is moderate and the production of the book is all that can be desired.

BERICHTE ÜBER DIE GESAMTE PHYSIOLOGIE.

Herausgegeben von Professor C. OPPENHEIMER und Professor P. RONA. Berlin: Verlag von Julius Springer. 1920.

THIS useful periodical was suspended during the war and is now again appearing fortnightly, as a continuation of the *Zentralblatt für Biochemie und Biophysik* of Hermann's and also of Maly's *Jahresberichte*, while it is associated with the German Physiological Society. Each section runs to 80 pages, the abstracting is done with care and judgment, while the subjects in review cover a wide area, not only as to the progress in animal, physiological, and pathological chemistry, but also as to chemistry in its application to agriculture, and the ever-increasing sphere of what is known in Germany as "Biophysik." There is no publication exactly comparable to it, either in its scope or its usefulness, in English or, so far as we know, in any other language. It gives reports from some journals which are not likely to be available, at least in these days, to many physiologists.

JOURNALS.

Journal of the Royal Naval Medical Service. July, 1920.—The first place in the July issue is given to a delightful account of a fine piece of successful work by Surgeon Commander L. F. Cope, R.N. Commander Cope reached Belgrade in December, 1918, when he found himself, as he says, "at a loose end," and was told by the senior naval officer to look round and find some occupation that would help the Serbs. This he proceeded to do, and his narrative should be read as a war story, for he gives a most effective picture of the disorganisation of a town that has changed hands in war, a disorganisation quite unknown to us at home, as none of our towns have been fought through. He shows well the difficulty of re-establishing the services of civilised life among the inhabitants of such a city, worn out as they are by the fatigue of war. "The condition of Belgrade was deplorable. ..... The hospitals had been very completely pillaged by the enemy; ..... while the empty wards had been deliberately and liberally befouled with fæces." He first tried to remove filth from the streets, but could get no carts; then he tried to build destructors, but could get no labour. In searching for labour he found a prison with 200 starving, verminous, and miserable Austrian prisoners. While trying to get this place cleaned he met Major Edward Stuart, a sanitary officer of the American Army, also busy at this work. They combined forces and "proceeded to make things move." They hunted for baths, found 12 and took four, found six disinfectors and seized two, and made a great discovery of cresol and sulphur. Then they were started, and in eight days "killed our first louse in spite of every difficulty officialdom could put in our way." The next day cases of typhus were reported, so something more must be done. As Belgrade had been a great Austrian military centre it was obvious that there must somewhere have been a great disinfecting station. But no one had any knowledge of it. So Cope and Stuart had to quarter the town to find it, and they did ultimately "locate it in a waste of snow-covered fields outside the town." They told the War Minister about it and ordered soldiers in for disinfecting. It was here their real troubles began. They stole six soldiers as a permanent working party; they got a Serbian officer as their adjutant. They chose him as he spoke French and German but no English, so they could discuss matters briefly between themselves without hurting his patriotism by their comments, for there seemed to be little business-like efficiency in the Balkans. They got soap from the Serbian Relief Fund, underclothing from the American Red Cross, electric light and water from the mayor, and coal from the Navy, which also lent an engine-room artificer, who made the disinfectors go (they had been made useless by the Austrians before they left). But the work would never have been done without Miss Simmonds, of the Sandes-Haverfield Canteen, "a Canadian, and the most remarkable woman I have ever seen." "Alone, without authority ..... she took a building ..... begged, borrowed, and stole" its equipment, and made it into a rest-house for Serb soldiers, who loved her and did anything for her. Miss Cullis, a lady sanitary inspector, was also "priceless." She knew no foreign language, and was a stranger in a new country, but "she performed miracles." She got a filthy house for 50 people cleaned inside and out, beds and bedding installed and disinfected when required, stopped thieving, and got the plumbers to do their work thoroughly. Two other disinfecting stations were established, one 40, the other 30 miles from Belgrade. There had been 67 cases of typhus in Belgrade to begin with. In the first week of the delousing campaign 20 cases occurred, but thereafter only 17 altogether, which shows how effective was this work. 15,000 men were deloused. Women and children were put under the care of American Red Cross nurses. Surgeon-Commander Cope tells his story well and gives us good photographs. Our only regret is that he gives us no picture of the Serbian soldiers, "the finest set of men I have ever seen."

British Journal of Children's Diseases. Vol. XVII., April–June. Edited by J. D. ROLLESTON, M.D.—In the first part of a paper entitled "Stigmata of Predisposition to Bone and Joint Tubercle," Mr. W. C. Rivers gives a historical retrospect of the literature dealing with the definite personal characteristics found more frequently in the subjects of bone and joint tubercle than in the non-tuberculous.—In his paper on Traumatic Stricture of the Urethra in Children and Young Subjects, with Some Remarks Concerning the Immediate Treatment of Ruptured Urethra, Mr. A. Ralph Thompson describes three typical cases of traumatic stricture in boys, the prognosis of which he regards as very grave. He strongly recommends suprapubic cystotomy as a routine measure, which greatly assists the adequate treatment of ruptured urethra. He points out that treatment by catheterisation may be carried out, but if it fails excision of the stricture will be required. In an operation for excision of a stricture he emphasises the importance of: (1) preservation of an intact urethra; (2) removal of as much fibrous tissue as possible; (3) deep burial in surrounding strictures of the sutured urethra.—Dr. J. Black-Milne describes two cases of anomalies of growth: Unilateral Macrosomia and Congenital Overgrowth of the Right Leg. In the first case, which occurred in a male aged 18, the right side of the body was affected and there were no anomalies of growth in the family or collateral lines. In the second case, which occurred in a patient of the same age and sex, the right lower limb was 1½ in. longer than the left, but did not show such good muscular development. The chief point of interest in the cases was that the father showed a similar anomaly and of about the same degree. According to Dr. Black-Milne no heredity has been traced in any other cases of hemihypertrophy on record.—In a paper on Unilateral Dwarfism concerned with Congenital Multiple Chondromata Dr. Parkes Weber records a case in a boy, aged 13, whose right tibia, ulna, and radius were unusually short and showed the presence of chondromata on X ray examination.—In a Retrospect of Otology, 1919, Mr. Macleod Yearsley summarises the recent otological literature of pædiatric interest.—The abstracts from current literature are devoted to child welfare and otology, rhinology, and laryngology.

FRENCH SUPPLEMENT TO THE LANCET

Under the Editorial Direction of

Professor CHARLES ACHARD, PROFESSOR OF PATHOLOGY AND THERAPEUTICS IN THE UNIVERSITY OF PARIS.

AND

Dr. CHARLES FLANDIN, D.S.O., CHEF DE CLINIQUE A LA FACULTÉ DE PARIS.

SERUM TREATMENT OF HÆMOPHILIA.

BY P. EMILE WEIL,

PHYSICIAN TO THE HÔPITAL TENON.

THE physiological basis of hæmophilia is a more or less considerable retardation of the blood coagulability; otherwise the blood is clinically and histologically normal. This retardation diminishes or disappears when the blood is placed in vitro in contact with human or animal blood serum. The subcutaneous or intravenous injection of human or animal serum corrects the fault in coagulation and momentarily heals the hæmophilia, being both preventive and curative. The serum provides the blood with the missing ferment, thrombokinase or thrombozyme. On these experimental results the present writer has established the therapeutics of hæmophilia.

Treatment of Actual Bleeding: (a) External Hæmorrhage.

Once the hæmophiliac diathesis is recognised, treatment varies according as the bleeding point can be reached or not.

Every external hæmorrhage will be treated locally. A piece of gauze soaked in blood serum (simple horse serum, antidiphtheria serum, hémostyl, &c.) is placed in contact with the wound. In some cases it is well to use serum desiccated in vacuo at 0°; immediate and definitive hæmostasis results.

Contact between the serum and the wound is indispensable. If clots are interposed the coagulating action is not produced. Every hæmophiliac wound must be cleansed under all circumstances without hesitation. In dental hæmorrhage dressing of the socket must be preceded by cleansing with abundance of normal saline to remove clots; a plug soaked in serum is then applied. If a hæmatoma has formed, as, e.g., the result of a penetrating wound, it is best to open the hæmatoma, remove the clots, and then apply the serum dressing. General treatment is usually not enough, whilst local treatment procures cessation of the hæmorrhage in a few minutes.

Serum treatment transforms the therapeutics of hæmophilia. It is no longer a noli-me-tangere.

(b) Internal Hæmorrhages.

In cases of internal hæmorrhage (deep-seated closed hæmatomata, hæmarthroses, hæmaturias, &c.) serum should be injected. If the serum is human, venous injection may be adopted, with almost immediate arrest of the hæmorrhage. If the serum is of animal origin (simple horse serum, hémostyl, antitoxic serum) the subcutaneous method must be used. We do not advise injecting deeply into the muscles; the injections are often followed by small effusions of blood, which would be painful under the pressure of aponeuroses.

As a rule, the quantity injected is from 20 to 30 c.cm. A single dose is enough to arrest the hæmorrhage, stronger or repeated doses being rarely necessary. No drawbacks attend the use of the same quantity for children. Ingestion of serum gives no results in internal hæmorrhage, except bleeding of the stomach, where the serum acts locally.

If the hæmorrhage returns, treatment in the same way must be recommenced. A draught of chloride of calcium (1 or 2 g. daily) may be prescribed, not only to increase the coagulating action of the serum but also to avoid serum disease. The addition of vaso-constrictor medicaments is not necessary for hæmostasis, but rectal injection, drop by drop, of glucose adrenalin serum seems very often to be useful, especially from the cardiovascular point of view when the loss of blood has been great.

Results of Such Treatment.

Properly directed serum treatment has always given us successful results. We do not advise recourse to gelatin, which could not be administered subcutaneously, but only by the rectum; injections of hemialbumose have seemed of small value.

We do not report here the very numerous cases in which serum treatment has brought about the arrest of bleeding following upon a dental extraction, circumcision, or in cases of hæmarthrosis or hæmatoma; we prefer to state the results of various authors who have used our method. Marcel Labbé has done well with serum injections in several cases of hæmophiliac hæmorrhages. Wirth (of Vienna) has by this means stopped hæmorrhages not yielding to any medication. Mauthner (of Vienna) has seen a dental hæmorrhage lasting three days stopped by an injection of 40 c.cm. of serum. Broca, Schiffers, Déjardin (of Liège), Lommel (of Ina) have published similar successes. Le Jemtel (of Alençon) arrested a very profuse external hæmorrhage consequent on an unimportant surgical intervention by an injection of antidiphtheria serum. In their theses on the treatment of stubborn hæmorrhages Eliçagaray and after him Giroud (of Lyons) report several cases in which the method was successful.

In a certain number of cases published the serum treatment failed (Dahlgren, Baum of Kiel). We ourselves have recourse to local, concurrently with general, treatment in open hæmorrhages, and in over a hundred cases we have not failed to master the loss of blood.

Incidental Preventive Treatment of Bleeding in Hæmophiliacs.

Preventive treatment may be incidental or continuous. In the former case the treatment is to enable the patient to undergo a surgical operation. It is enough to inject 20 to 30 c.cm. of animal serum subcutaneously, at most one or more days before the operation.

Since the rectification of the blood is very usually partial, we advise against subjecting hæmophiliac subjects to any but indispensable operations—extraction of teeth, opening of abscesses, operations for acute appendicitis, &c.—always bearing in mind the possibility of hæmorrhage. However, in practice we have never had accidents with patients in whom injections had been made before operation.

During the operation the wounds should be plugged with animal serum, and after operation a serum dressing should be applied.

Continuous Preventive Treatment.

In the second and more usual case one has to deal with children with a family history of hæmophilia and repeated hæmorrhage. If the parents understand their duty, continued treatment may be suggested. As the rectification brought about by injections only lasts from six weeks to two months, serum injections must be carried out every two months. Adult hæmophiliac patients, who are subject to recurrent accidents—hæmaturia, for example—are quite willing to undergo renewed injections in spite of the possible small anaphylactic drawbacks. In themselves very small and variable, these incidents (fever, urticaria, arthralgia) are not of such importance as to give up a treatment which really transforms the complaint.

We have followed thus half a dozen typical cases of hereditary hæmophilia, in which hæmorrhages were occurring every month or two months; after treatment they ceased for several years to show any symptoms of hæmophilia. At the outset their blood required several hours for coagulation, but at the end only 45, 30, or 14 minutes. The complaint had aged in several months as much as it would have done in 20 or 30 years without assistance.

The prognosis is transformed by the continuous serum treatment. Whilst Carrière, summing up a mass of hæmophiliac cases, estimates that 89 per cent. of patients do not live beyond 20 years, I have not lost one out of more that 50 patients. Moreover, under prolonged treatment the complaint becomes so attenuated that it seems as if treatment might even be given up after several years; this was well shown in one of our patients who, after six years of continuous treatment, went through five years of war without misadventure.

The important question presents itself whether, in women of a hæmophiliac stock, preventive serum treatment during pregnancy would enable them to bear healthy children. We have not yet had any opportunity to make any experiments in this direction.

Technique of Preventive Treatment.

The technique consists in making subcutaneous injections of blood serum in doses of 20 c.cm. every two months. Later on, after considerable improvement, injections are only necessary every three months. It is hardly possible to put off the injections any further.

In this continuous cure we have generally used animal serums without reason to regret it; but, if it could be done easily, human serums would be preferable. Chalier (of Lyons) has successfully used maternal serum, injected in doses of 30 to 40 c.cm. every fortnight.

Very good results have been obtained in hæmophiliac accidents by transfusion of blood. This method, though legitimate in serious hæmorrhage, cannot be recommended as habitual treatment, since blood tranfusions cannot be renewed every two months for years on end. In any case, we would utter a warning against subcutaneous hæmotherapy. In a serious case we have seen, after a dose of 25 c.cm. of human blood, an enormous hæmatoma form in the back and abdominal wall, the clot acting as a foreign body and causing a copious hæmorrhage.

COAGULATION OF THE BLOOD:

A STUDY OF THE ANTI-COAGULANT ACTION OF SODIUM CITRATE AND OF THE PART PLAYED BY CALCIUM IN THE BLOOD.

BY MARCEL BLOCH,

CHEF DE LABORATOIRE IN THE FACULTY OF MEDICINE, PARIS.

THE study of the coagulation of the blood, which ought to be of great use in nosography, has been hampered by the insufficiency of the methods to measure its pathological variations. It is a phenomenon which lends itself with the utmost difficulty to exact measurements. In another place[1] I described numerous methods based on the speed of coagulation in vitro (methods of Vierordt, De Mutach, Biffi, Schultz, Angelo Petrone, Brodie and Russell, Wright, and Sabrazès). MM. Achard and Binet have just described a neat technique. The methods of Hayem and P. E. Weil are the simplest, and these workers have made a profound study of blood coagulation in numerous pathological states.

Retardation of coagulation in vitro can be observed in normal subjects and in affections such as pneumonia, acute articular rheumatism, associated with an excess of fibrin in the blood; but though direct examination may be able to prove states of diminished coagulability, it is only with difficulty that it allows of appreciating states of exaggerated coagulability. Finally, it is very hard to avoid causes of error.

[1] Marcel Bloch: La Coagulabilité Sanguine, Thèse, Paris, 1914.

Consequently the speed of coagulation in vitro does not always accurately represent the coagulability. To find some method of measuring "the forces producing coagulation" as they exist in the blood in the vessels it is necessary to prevent them from determining coagulation in vitro, to immobilise them whilst leaving them intact, and to restore their activity so as to measure them in the laboratory.[2] The use of *citrate of sodium* has enabled me to fulfil these conditions.

Action of Chemical Anti-coagulants in Vitro.

Very many substances are capable of hindering blood coagulation in vitro (acids, alkalis, salts, extracts of organisms, venoms, alcohol, &c.). But those alone of importance in establishing a method of measuring are such as are strictly measurable, and do not a priori seriously affect the important elements of the blood, as do acids, alcohol, &c. The most carefuliy studied and frequently used anti-coagulating salts are the oxalates of sodium and potassium, fluoride, and citrate of sodium.

The action of the *oxalates* is well known from the work of Arthus and Pagès.[3] A proportion of about 1 per 1000 in the blood causes incoagulability by the precipitation of calcium in the form of an insoluble compound. The introduction of a new soluble calcium compound (even solubilised calcium *oxalate*) into the oxalate mixture restores the coagulating property. Theoretically, it is of interest to add that Hammarsten and Pekelharing have shown that the process of coagulation in the oxalated blood is arrested at the stage of the formation of the fibrin-ferment or thrombin. The calcium salts would therefore be necessary to the transformation of the prothrombin into thrombin. But as soon as the thrombin is formed the calcium salts are no longer necessary, and coagulation proceeds even in their absence.

Sodium fluoride added to the blood also produces incoagulability by precipitation of calcium, but the addition of soluble calcium salts does not make the mixture coagulable. Bordet and Gengou[4] have shown that the precipitate of calcium fluoride thus formed had absorbed all or part of the coagulating ferments and even of the fibrinogen.

Now, if the amount of oxalate of sodium, used in the experiments described above, is slightly increased, results are obtained analogous to those got when fluoride is used. The insoluble oxalate of calcium has therefore operated like calcium fluoride to absorb some or all the substances (in the classic theory called the ferments) which give the blood its coagulating qualities. Even in smaller quantities the sodium oxalate possesses qualities noxious to the "coagulating forces" of the blood, though to a lesser degree. Citrate of soda is not open to these objections.

The Action of Citrate of Sodium.

Like oxalate and fluoride, citrate of sodium makes the blood incoagulable when added at the rate of about 1 per 1000. The addition of a soluble calcium salt—for instance, calcium chloride—immediately restores the coagulating property. The citrate has produced incoagulability by acting on the calcium in the blood. But the difference in action of the citrate and of the oxalates and fluorides is shown directly by an easily repeated experiment. The addition of chloride of calcium to a solution of the latter causes a dense white precipitate. The addition of chloride of calcium to a solution of citrate of soda occasions no precipitate. Contrary, therefore, to the oxalate and fluoride, if the citrate acts on the calcium it does not do so by way of precipitation.

More than ten years ago this action of citrate of sodium on the calcium perplexed biologists (Sabattani,[5]

[2] Two other indirect methods with the same aim have been described: (*a*) Wright, Chantemesse, and Cathala take a series of drops of blood from the thumb and examine the quantity of the admixture of oxalate of potassium necessary to prevent coagulation; (*b*) Et. Brissaud (Paris, Baillière, 1911) makes use of the properties of salted plasma, studied by Bordet and Gengou.

[3] Arch. de Physiologie, 1890–1891.

[4] Ann. de l'Inst. Pasteur, 1912.

[5] Journal de Physiol. Interne, XXX., 2.

1900-1901). In modern chemical terminology the calcium is in a latent state. In 1902 Arthus comes back to the question.[6] By its immobilising action on the calcium salts of the blood the citrate prevents the transformation of the profibrin ferment into ferment. Similarly citrated milk does not coagulate under the influence of the lab-ferment. Arthus has endeavoured to determine the nature of the phenomenon by means of ingenious experiments.

Citrate of soda is shown to be antagonistic to precipitating salts, and it may be considered as endowed with direct antiprecipitative properties. Now, the alkali oxalates and fluorides possess, on the contrary, no antiprecipitative action with regard to chloride of sodium. We have here a fundamental difference between the salts and the citrates.

We must add that Arthus's stable emulsions resemble colloidal solutions; that the alkaline earth salts and the calcium salts in particular have a very special precipitative action on them; and that these same calcium salts have a fundamental part to play in the blood and its coagulation.

The Action of the Citrate on the Blood Calcium.

In 1902, at the end of his essay, Arthus declared that it did not seem possible to set up any likely hypothesis about the anti-coagulating effect of the citrate in the blood. Contrary to Arthus, M. Luigi Sabattani[7] thinks that the anti-coagulant action of the citrate can be explained. This is due to his conception of the state of the calcium in the blood. In order that coagulation may take place, not only must a certain quantity of calcium salts be present, but also the ionised state of the calcium. The citrate which does not precipitate the calcium salts leaves the quantity of dissolved calcium intact, which was in the blood and which was enough for its coagulation, but it modifies its state of ionisation and thus annihilates it functionally.[8 9]

Part Played by Blood Calcium.

When the blood is citrated the pre-existent calcium dissolved is in no way diminished in weight; the citrated blood contains as many molecules of calcium salts in solution as normal coagulating blood, and yet it does not coagulate. It will at once recoagulate if another calcium salt is added. It must therefore be admitted that the citrate has occasioned a change of state of the blood calcium which completely arrests its action in coagulation.

This phenomenon is not isolated, and modern chemists can readily furnish examples of what they call "bodies in a hidden state." Examples might be multiplied, but it is enough for us to know that a body—metal or metalloid—can exist in a solution in such a state that it is incapable of manifesting its properties. This is what the addition of the citrate has done in the blood with respect to the calcium. The citrate has hidden the calcium.

If we may borrow terms from modern serology without in any way comparing the phenomena, we might say that the citrate inactivates the calcium in a calcic solution—e.g., blood—and that the addition of a little more calcium suffices to reactivate the solution.

Let us now sum up some of the discoveries of modern physical chemistry. The bodies which may be added to a given colloidal solution behave in two ways. Some, the "electrolytes," tend to precipitate the solution—e.g., certain salts of the alkalis or alkaline earths; they are *precipitants* or *instabilisers*. Others reinforce the capacity of the solution to remain in the colloidal state; they are *stabilisers*.

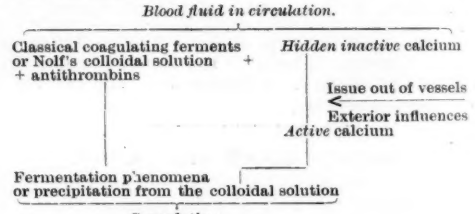
Let us, then, look upon the *blood plasma* as a *colloidal solution*. From the physico-chemical point of view this is the modern conception; it is that used by Nolf in order to establish his theory of coagulation. This blood plasma contains *electrolytic precipitants;* they are the calcium salts. If certain bodies like citrate of sodium are added to the blood they act as *stabilisers* of the colloidal blood solution and prevent the electrolytic calcium salts from exercising their peculiar precipitating properties, and this without in any way affecting the quantities of dissolved calcic salts. The *ion calcium* may therefore with the greatest ease be *active* and provoke coagulation, or *inactive* and bring about incoagulability.

Suggested Hypothesis.

For this reason we feel at liberty to set up the following hypothesis: The blood when fluid and circulating in the vessels is in analysis chemically identical with the coagulated blood in a glass tube. The formation of fibrin is due to a change of physical state of those constituent elements which circulate as fluids in the vessels. Now, if, as we have seen is the case, a simple change of physical state of the calcium is enough to cause or prevent the coagulation of the colloidal sanguine solution in vitro, why not suppose that in the blood circulating in vivo the calcium exists in the inactive latent state? May not simply the issuing from the vessels, exposure to the air, contact with the walls of the recipient and with Nolf's thromboplastic substances (dust, powders) be enough to transform this hidden inactive state of the calcium into an active electrolytic precipitant state with respect to the colloidal solution ?[10]

It is possible that the mechanism of the activation of the calcium is not simple. The anti-coagulating (antithrombin) substances of the plasma are perhaps "stabilisers" of the colloidal blood solution, antagonistic to the calcic precipitating electrolytes. These are antiprecipitant bodies, which would change their physical state on egress from the vessels under the influence of exterior contacts, lose their stabilising power, and set free the action of the calcium salts.

In any case we are led to assign to the calcium salts of the plasma the main active part in the phenomenon of the fluidity of the blood and the act of coagulation. This part is summed up diagrammatically in the following table:—



Physico-chemical Conception of Coagulation and of the Old "Diastasic Phenomena." Catalytic Coagulation Phenomenon.

There is in chemistry a whole category of phenomena, produced only in presence of bodies, which do not seem to partake in the reactions because they are not modified, but nevertheless they are necessary to their production. This is what is termed *catalysis*. We believe that coagulation belongs to the category of these catalytic phenomena, calcium being the necessary active body, the "catalyser."[11]

Nolf's idea, the theory of colloidal precipitations, is not as opposed as one might believe to the classical fermentation, enzyme, or diastase theories. Indeed, the modern theory of the diastases is very different

[6] Soc. de Biol., May 10th, 1902 (Inst. Pasteur de Lille).
[7] Soc. de Biologie, May 14th, 1902.
[8] Arch. ital. de Biol., t. xxxvi., f. 3.
[9] Pharmac. expér. Cagliari.

[10] It is well known that certain writers of to-day assign great importance to the sudden changes caused in the physical equilibrium of the serum with sudden disturbances created in the blood colloids "by commonplace, purely physical, causes, such as cold" (Widal). To phenomena of this order would belong the "blood crises" (with coagulation disturbances), anaphylaxis, injections of heterogenous albumins, paroxysmal hæmoglobinuria, asthma, urticaria, &c. See Widal, Abrami, E. Brisnaud, Joltrain, Société Médicale, Feb. 13th, 1914; Semaine Médicale, Dec. 14th, 1913; Presse Médicale, June, 1914.

[11] This term has already been applied to coagulation. The fibrin ferment performs the transformation of the fibrinogen into fibrin in the manner of a catalyser without itself taking part in the constitution of the fibrin (classical theory).

from that held a few years ago. There is a tendency to draw nearer to the original opinion of Arthus and Naegeli, who denied that the action of the diastases was due to their chemical constitution, but considered that they acted like special transmissible forces, such as electricity and light.

We are acquainted with a large number of enzymic phenomena where the presence of a trace of an acid, alkali, or salt is of fundamental importance, like the trace of calcium salt in coagulation. The importance of other mineral substances (iron, manganese) is as great in other diastasic phenomena (G. Bertrand, Trillat, Phocas). Finally, the discovery of non-albuminoid diastases and of purely metallic colloidal solutions, having the property of diastases (Bredig, Trillat, Robin, Bardet), has completely modified our conception of these latter. Their catalytic action appears to be due, not to the nature of the metal itself, but to the *colloidal form* in which it is presented. Thus, in all these former fermentation phenomena the part played by the mineral element steps into the foreground. Consequently, the part in coagulation which we propose to assign to the calcium is not exceptional. As regards the intimate nature of the mineral element in the catalytic phenomenon, it is of necessity still entirely hypothetical.

Application to Method of Measuring Coagulability.

In practice the blood is first mixed with a measured solution of citrate of sodium (1 c.cm. of blood in 4 c.cm. of citrate of sodium of 1 to 400). The dilution and calcic inactivation prevent the intervention of foreign contacts, the cause of so many errors in direct coagulation observations.

The next step is to divide equal quantities (2/10 c.cm.) of this citrated blood into a series of tubes containing increasing amounts of chloride of calcium (from 0·00005 g. to 0·0005 g. diluted in 4 c.cm. of isotonic salt solution).

At the end of several hours the series of tubes gives a succession of steps in coagulation, incomplete at first in the tubes containing little calcium, then more and more complete as we get near to the amount required for total coagulation. The tubes which mark commencement and end of coagulation are noted. The relationships between the quantities of citrate of sodium and chloride of calcium in these tubes constitute the "indices of coagulability." These indices are notably fixed for normal bloods (two at the beginning and one at the completion of coagulation); the stronger the coagulability the higher the indices, and inversely.

By this procedure we have been able to reveal various experimental and pathological variations of coagulability which other methods did not permit us to appreciate.[12] It allows of the most exact study of the qualities of the coagulum—normal retractility, hyper- or hypo-tractility, or irretractility.

Experimental Applications; Regulating Mechanism of Coagulability.

"In various organs (spleen, pancreas, lymphatic ganglions, small intestine, testes, brain, lungs) it is possible to reveal an anti-coagulating substance, probably identical with the antithrombin which passes from the liver into the blood under the influence of the peptone; in the organs this substance is masked by one or more substances which energetically activate the coagulation of the blood in vitro" (Doyon).

These substances, multiglandular in origin and inverse in action, balance each other and their result is coagulability; it is easy to show the instability of this state of equilibrium. If an animal is bled quickly and freely, the succeeding hours show a sudden fall of the indices followed by a reactional elevation above the normal. A return to the normal takes place only after a certain time. (Fig. 1.) If an animal is bled by degrees a fairly durable state of hypercoagulability can be produced.

The same phenomenon may be shown in man, after sudden or repeated hæmorrhages. We have here, perhaps, the explanation of the hypercoagulability found in certain affections (uterine fibroma) and accidents (thromboses, post-operation embolism).

[12] For details of procedure and results see Marcel Bloch, loc. cit.

Sudden loss of equilibrium may be observed on the sudden introduction into the animal of certain poisons, in particular of heterogeneous albumins. The experiment of the Schmitt-Müllheim type gives immediate prolonged

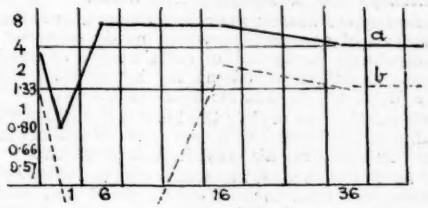


FIG. 1.—Fall followed by rise of coagulability after plentiful bleeding in the dog. Index of coagulability on the left of the chart, time in hours at the foot. (*a*) = commencing, (*b*) = complete, coagulation.

incoagulability of the blood of a dog which had just had an intravenous injection of propeptone with reactional hypercoagulability.

Clinical Applications: Sudden Disturbances of Coagulability.

We have here a new chapter of human pathology, which opened with the proof of disturbances of coagulability in the anaphylactic shock. They are comprehensible when we note the instantaneous formidable

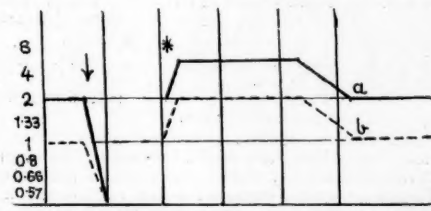


FIG. 2.—Incoagulability followed by reactional hypercoagulability after intravenous injection of peptone in the dog (shown by the arrow). The asterisk indicates a period 10 hours after the injection. (*a*) = commencing, (*b*) = complete, coagulation.

modifications undergone by the plasma elements in the experiment of peptone blood in the case of animals, and after copious hæmorrhages in men and animals. (Fig. 2.)

In the course of experimental anaphylactic shocks (Richet, Riedl, Kraus) it is possible to observe either the more or less complete incoagulability of the blood of the animal, or its hypercoagulability, which is often accompanied by fibrinolysis or redissolution of the clot. In human beings great anaphylactic shocks may be accompanied by phenomena of the hæmorrhagiferous class (purpura).[13] Certain symptom-complexes, such as paroxysmal hæmoglobinuria, urticaria, asthma[14] present coagulation disturbances in the course of the crisis (hypercoagulability, irretractility of the clot, fibrinolysis). In the fight against these hæmoclastic crises, or sudden entire losses of equilibrium of the plasma colloids, M. Widal has successfully used intravenous autoserotherapy.

Conversely it has been suggested to combat certain hæmorrhage conditions by means of the hypercoagulability consequent on anaphylactic shocks produced by reinjection of heterogenous serums (Dufour and Crow[15]).

Slow Disturbances of Coagulability.

These may be noted in numerous illnesses. With the index method we have determined the coagulability in a number of diseases.

[13] J. Halle and Marcel Bloch: Choc anaphylactique dans la séro-thérapie antidiphtérique (Soc. de Pédiatrie, February, 1913).

[14] Widal, Abrami, et Brissaud: Semaine Médicale, Dec. 24th, 1913, Hémoglobinurie paroxystique, Id., id., et Joltrain, Soc. Méd., Feb. 13th, 1914, L'Urticaire, Presse méd., July 11th, 1914, L'Asthme.

[15] H. Dufour et Crow: Utilisation thérapeutique du choc anaphylactique, Soc. méd. des hôpitaux, June 5th, 1914.

With marked hepatic insufficiency *affections of the liver* produce a clear diminution of coagulability. The predominant part played by the liver amongst the organs regulating coagulability explains most of the hæmorrhagiferous accidents in liver cases.

Lesions of the kidney may also cause a lowering of the indices of coagulation, which partly explains the "hæmorrhagic diathesis" of certain cases of Bright's disease. In extensive œdema the hydræmia seems to have a direct action in reducing coagulability.

Cardiac affections modify the indices in various ways, probably in accordance with the state of the organ or organs most severely attacked in their functions.

The *lungs* play a most important part in the secretion of coagulating substances (Doyon, Morel and Kareff, Roger[16]). Considered clinically a mechanical congestion of the lungs may produce considerable diminution of coagulability (Marcel Bloch[17]). The same observation can be made in ordinary pulmonary tuberculosis during the period of softening.

In simple *pneumonia* hypercoagulability is constantly present, persisting for several days after defervescence. It must be noted, from the point of view of diagnosis, that in influenza, typhoid, and miliary tubercle the indices are normal or lowered. For prognosis lowering of indices of coagulation is a sign of deterioration. It is found above all in pneumonia of alcoholic patients with fatal termination.

In *polyglandular and endocrinous* affections coagulability may be disturbed. P. E. Weil[18] has recently insisted on the disturbances in coagulation in the course of menorrhagia of women presenting signs of ovarian, thyroid, pituitary, or suprarenal insufficiency.

In toxic infections coagulability is variable. Whilst always increased in *acute articular rheumatism*, it is usually lowered in *typhoid fever*, sometimes very greatly so in hæmorrhagic forms.

In certain toxic infectious cases, acute diphtheria, for instance, the indices are raised in spite of the hæmorrhagiferous conditions. Indeed, the key to the hæmorrhagiferous symptom complex is not always given by the study of coagulation; the conception of endothelio-vascular insufficiency or dystrophy must be conjoined with it. It may be proved by the "*signe du lacet*" (Weill, of Lyons). The hypertension induced by light constriction of a portion of the member provokes the bursting of small vessels in the subjacent zone and the immediate appearance of a fine scattered purpura.

The study of the vascular resistance and of coagulability combined permits of interesting distinctions in the purpura and thrombosis symptom complexes. By the side of purpura with diminished coagulability there are purpuras with normal coagulability but irretractility of the clot (insufficiency of blood-plates) and purpuras with normal coagulability and diminution of vascular resistance (endothelio-vascular insufficiency or dystrophy).

Similarly, it is possible to distinguish venous thromboses with increased coagulability (aseptic thromboses in childbirth, coagulability indices increased at the end of pregnancy), distinct from infectious thrombophlebitis, and, finally, thromboses with endothelio-vascular dystrophy, where the coagulability is normal but in which it is easy to prove a weakening of vascular resistance, sometimes hereditary in the family.

In the case of *hæmophilia* the problem is still more complex. In true hæmophilia we have considerable lengthening of the coagulation period, abnormal coagulability indices, sometimes precocious start, but enormous decrease of index of complete coagulation. *Hæmophilia states* must be placed beside them for comparison. These are states of very diminished coagulability and vascular resistance occurring in the severe types of purpura, hæmoglobinuria, pernicious anæmia, scurvy, &c., and in the hæmorrhagic forms of the acute exanthems.

[16] Roger, Les fonctions du poumon, Presse méd., November, 1912.
[17] Marcel Bloch: Loc. cit.
[18] P. E. Weil: La durée des règles, les ménorrhagies, troubles de la coagulation sanguine, Soc. de Biol., April 27th, 1912; Traitement par le sérum sanguin, J. de Méd. int., Oct. 10th, 1913.

Previous Contributions.

The French Supplement to THE LANCET—under the Editorial Direction of Professor Charles Achard, Professor of Pathology and Therapeutics in the University of Paris; and Dr. Charles Flandin, D.S.O., Médecin-Major de 2me Classe, Chef de Clinique à la Faculté de Paris—has appeared on the dates given in the following list, which sets out the titles and authors of the contributions:—

Sept. 21st, 1918: (1) The Microbic Diversity of the Enteric Fevers, by Professor Achard. (2) Post-Typhoid Atony of the Cæcum, by Maurice Loeper, Professor of the Faculty of Medicine and Physician to the Paris Hospitals.

Oct. 19th, 1918: (1) What the War has Taught Us about Tetanus, by Louis Bazy. (2) Tetanus Consecutive to Superficial Wounds and to Trench Foot: Treatment and Prevention, by Professor Raymond, Médecin Principal de 2me Classe.

Nov. 30th, 1918: (1) General Review of French Cardio-Pathology during the War, by Ch. Laubry, Physician to the Paris Hospitals, Médecin Major de 2me Classe. (2) Methods of Estimating Augmentation in Depth of Volume of Left Ventricle, by Dr. Bordet, Director of the Radiological Laboratory of the Centre of Cardiology of Professor Vaquez, Hôpital St. Antoine.

Jan. 11th, 1919: (1) Gunshot Concussion of the Spinal Cord, by Henri Claude, Professor in the Paris Faculty of Medicine, Physician to the Paris Hospitals; and Jean Lhermitte, formerly Chef de Clinique in the Paris Faculty of Medicine. (2) Contribution to the Study of the Manifestations of Emotional Shock on the Battlefield, by Cl. Vincent, Physician to the Paris Hospitals, formerly Medical Officer to the 46th and 98th R.I. and to the 44th B.C.P.

March 1st, 1919: The Surgical Complications following Exanthematic Typhus, by Dr. Paul Moure and Dr. Etienne Sorrel, Prosectors to the Faculty of Medicine, Paris, Médecins Aide-Majors de 1er Classe, Surgeons to the French Hospital at Jassy.

April 5th, 1919: (1) Nervous Complications of Exanthematic Typhus, by A. Devaux, formerly Interne of the Paris Hospitals, Médecin-Major de 2me Classe. (2) Note on the Epidemic Diseases Observed in Rumania during the Campaign of 1916–17, by Dr. Henri Vuillet, late Interne of the Paris Hospitals.

May 3rd, 1919: (1) Malaria During the War, by G. Paisseau, Médecin-Major de 2me Classe. (2) Distribution of Soldiers, Temporarily Unfit through Malaria, in Agricultural Colonies, by Professor E. Jeanselme. (3) Studies on Renal Function in Chronic Nephritis, thesis by Pasteur Vallery-Radot, reviewed by Professor Charles Achard.

June 21st, 1919: (1) Recent Work on Cerebro-spinal Fever, by C. Dopter, Professor, Val-de-Grâce, Médecin-Chef to an Infantry Division. (2) Meningococcal Rheumatism and Arthritis, by Dr. Paul Sainton, Physician to the Paris Hospitals.

Aug. 23rd, 1919: Radiological Examination of Pseudarthroses before and after Operations of Bony Grafts, by Paul Aubourg, Professor Agrégé, Cuneo's Laboratory for Radiology. (Centre for Surgery of Bones, Hospital 75, Cannes.)

Sept. 27th, 1919: (1) Dysidrosis: its Parasitic Nature, by J. Darier, Physician at the Hospital of St. Louis; Member of the Academy of Medicine. (2) The Contagiousness of Favus in Man, by R. Sabouraud.

Nov. 8th, 1919: (1) Secondary Echinococcus, by F. Dévé, Professor at the School of Medicine, Rouen. (2) A Case of Peritoneal Echinococcus, by Charles Flandin, Chef de Clinique Médicale at the Faculty of Medicine in Paris.

Dec. 20th, 1919: French Work on Ictero-Hæmorrhagic Spirochætosis, by Marcel Garnier, Physician at the Lariboisière Hospital, Paris.

Jan. 31st, 1920: (1) Some Appliances for the Examination of the Nervous and Muscular Systems, by Dr. Jean Camus, Professeur Agrégé of the Medical Faculty in Paris; Médecin des Hôpitaux. (2) The Laws of Tremor, by Dr. Léon Binet, Interne des Hôpitaux, Paris.

THE LANCET can be ordered through any Library in France or through the following special agents:—

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THE LANCET.

LONDON: SATURDAY, AUGUST 7, 1920.

Unprincipled Medication.

THE Proprietary Medicines Bill, introduced by Lord ASTOR in the House of Lords on July 13th, raises in particularly acute form the right of the State, or of one department of the State, to restrict the liberties of a flourishing industry on the plea of benefiting the community at large. No adversary of the measure could state the case in stronger terms than those which can be employed in its advocacy. The Bill, now being discussed, sets out to prohibit the sale of such remedies as are sold under a trade name or manufactured by a secret process, unless and until they have been registered by the Ministry of Health, a formality which assumes a disclosure in confidence of their composition. The Bill prohibits altogether, under penalty of heavy fine or imprisonment or both, the sale of remedies purporting to cure certain diseases or disorders, of which a preliminary list of 12 is given in the Schedule to the Bill. The list contains at present the following items: (1) cancer, (2) consumption, (3) lupus, (4) deafness, (5) fits, (6) epilepsy, (7) amenorrhœa and other diseases peculiar to women, (8) diabetes, (9) paralysis, (10) locomotor ataxy, (11) Bright's disease, (12) rupture; and the Minister is to be empowered to extend, as he may think fit, by regulation laid before Parliament, a list already of a comprehensive nature. Other provisions in the Bill disallow the vendor of any proprietary remedy from entering into personal correspondence with those who buy and use his wares, and also the employment of the "trailer" advertisement—being the enclosure with one remedy of printed matter recommending another—becomes illegal. It is evident that if the Bill becomes law it will drastically restrict the operations of a trade forming a substantial section of the London Chamber of Commerce and known to contain more than 300 manufacturers or vendors.

Public opinion is, however, unanimous in support of any measure designed to prevent the sale of fraudulent medicines and of drugs or appliances intended for immoral purposes. All appear to be fully aware of the undesirability of "cure-all" claims. Yet considerable protest has been raised against the Proprietary Medicines Bill in certain journals, wherein it is variously described as an insincere measure designed for the glorification of the Ministry of Health, as a further invasion of public liberty under the pretext of coddling, and as a serious threat to the comfort and convenience of a large section of the public. It is even suggested that the victims of incurable cancer will be deprived by the Bill of the remedies required to soothe and alleviate their sufferings; that, in fine, it is not the public interest but rather the sectional interest of the medical profession which is at the bottom of the changes proposed. The history of the Bill easily disposes of it as a piece of sectional or self-interested legislation. The proposals are based upon and do not go beyond the recommendations of the Select Committee appointed in June, 1914, to inquire into the sale and advertisement of patent and proprietary medicines and appliances, and to report what amendment in the law was necessary. Doctors, as is natural, were members of that Committee, and doctors were heard in evidence; but in neither case had they any numerical predominance, and the report of the Committee, whose personnel was of a very varied character, was presented with unanimity. Medical men, indeed, did not themselves come out scatheless from an inquiry revealing almost incredible degrees of cupidity on the one side and gullibility on the other. The Committee spoke with regret of medical men who allowed themselves to be made "the catspaw and fool of the fraternity of the secret remedy," and they had evidence in two cases of medical men acting as directors of companies manufacturing secret remedies.

The plain truth is that the lurid evidence laid before the Select Committee, and quoted by Lord ASTOR in support of the measure, was more than sufficient to move any body of citizens, not blinded by prejudice and self-interest, to immediate and forcible action. The sale of proprietary remedies had been increasing by leaps and bounds for some years before the Committee was appointed. Remedies prohibited in America were being shipped in enormous quantities for use in this country. Touting swindlers made fortunes here, only to meet with fine and imprisonment on attempting to do the same in Paris. Australia had refused to sanction the importation of many of the remedies, and more of the literature, freely circulating in this country. Lastly, the attitude of the newspaper and periodical press in regard to secret remedies was, speaking generally, very lax. In 1914 advertisements of proprietary medicines constituted a considerable source of income for many journals; a number of small provincial papers could hardly have existed at all without them, and the medical press was not too carefully censored. This fact led newspapers, either from discretion or under compulsion—we are now quoting from the report itself—to exclude from their columns criticism or discussion of secret remedies. For all these abuses the Select Committee thought that prompt remedies should be found, and upon their recommendations the new Bill has been framed for the protection of the public—and with that sole object.

The Hospital Survey.

REFERENCE was made in a recent number of THE LANCET[1] to Sir NAPIER BURNETT'S lucid and informing survey of the financial position of the voluntary hospitals throughout Great Britain and Ireland for the five years 1914–19. From this survey the statistics of the hospitals of London are excluded, as they come directly under the purview of King Edward's Hospital Fund, while there is no information as to 200 hospitals which left the request for information unanswered, and from 32 others which intimated that they had incurred no deficit, and therefore required no special assistance. We should have liked details as to how these desirable conditions were arrived at, while it is possible that some of the 200 who remained silent were similarly fortunate. It is to

[1] THE LANCET, July 20th, p. 83.

be regretted, considering the value at the moment of telling such of the story as present circumstances warrant, that answers should not have been forthcoming from all the institutions approached.

The conclusion is come to from the survey that the hospitals of the country as a whole are solvent. This is founded upon Sir NAPIER BURNETT'S tables relating to the four countries of the kingdom, which show that in 1914–19, for the 670 hospitals taken into account, the total to be regarded as ordinary income was £15,771,346, amounting, with legacies not earmarked for any special purpose (£2,061,830), to £17,833,176; and that the total ordinary expenditure of the same institutions was £17,462,299, leaving an excess of income, plus legacies, over expenditure of £370,877. This, it must be borne in mind, refers to a special period, 1915–19, the conditions of which may never recur, but which will be followed by a period influenced by those conditions and bearing little or no relation to anything that preceded the war. No general excess of expenditure over income plus legacies took place before 1919, when the total ordinary expenditure rose substantially. Before the war there were no problems of hospital finance that required immediate solution if the work was to be kept going, although the increasing need for hospital development in accommodation and equipment was felt by all connected with such institutions, while the level of subscriptions was not rising with the rise in material ease. Now the problems of finance have become urgently pressing on account of the results produced by the war. It will be observed, with regard to the quoted figures, that the solvency of the hospitals as a whole is only to be accepted as proved if we admit that legacies, not earmarked by the testator for any specific purpose, fairly rank as part of the hospital's ordinary income. It is not unreasonable that they should be so treated whenever necessary. To set them aside as capital, so that the interest borne by them alone is spent on the everyday requirements of the institution, is an ideal procedure which all should aim at. At the present time it is a counsel of perfection, which in many cases could not be followed without reducing the usefulness of the hospital. To borrow involves paying a higher rate of interest than the legacies, if invested, would be expected to bear. The money once spent cannot, however, be used for those renovations, expansions, and developments which are not to be looked upon as objects of ordinary annual expenditure. It is exactly the need for extraordinary expenditure which is pressing with many hospitals. Some have incurred debts through struggling to keep efficient and progressive during and since the war. Others have only remained more or less free from debt through refraining not merely from expansion and development, but from necessary repairs, cleaning, and upkeep. To the conclusion, therefore, that the voluntary hospitals as a whole exhibit sufficient vitality to enable them to "carry on" a provision has to be added: they must be assured a fair start in a new era of peace—an era characterised by enormously higher prices, by nursing staffs at increased salaries working for shorter hours, and by ambitions to benefit the public stimulated rather than diminished by the difficulties to be overcome.

The re-establishing of hospital finances upon a satisfactory basis is being achieved in London by King Edward's Hospital Fund, with the recent distribution of £250,000 from the capital of its own Fund, and with the still more recent gift of a like sum, entrusted to the Fund by the Joint Finance Committee of the British Red Cross Society and the Order of St. John of Jerusalem. This opportune gift, announced by Lord FINLAY on July 23rd, has already been allotted to hospitals which are prepared to treat ex-Service men, and is to be devoted to improvements rather than maintenance. It does not help these hospitals to catch up with their outstanding arrears of necessary repair and replacement. The immediate need of the hospitals of the United Kingdom outside London remains to be met; it is admittedly not so urgent. There are hospitals which can show a small excess of ordinary income, or of income plus legacies over expenditure, but it is not possible, and would not be just, to take from these in order to pay the debts of those whose expenditure has exceeded what they have received. Also, as Sir NAPIER BURNETT points out, it would not be fair to penalise those hospitals which have kept within their income by only subsidising those which have exceeded it. He advises that from any fund, hereafter available for the purpose, grants should be made upon inspection of individual hospitals by a competent authority constituted for that purpose. Further than this, he considers that for London and the country a sum of not less than three-quarters of a million is needed to meet the cost of alterations and repairs to buildings, and other matters with regard to which there are now five years of arrears to be made up. This means the expenditure of a million for immediate purposes, quite apart from an urgent need in many places for increased hospital accommodation. The provision of this further accommodation, as well as the more pressing matter of placing the hospitals as they stand in a satisfactory financial position, constitute a national question, and as to this Sir NAPIER BURNETT writes at the conclusion of his survey, which is addressed to the Joint Council of the British Red Cross and Order of St. John: "On another occasion I hope you will allow me to put before you some suggestions as to how far the State should be called upon to render assistance, and what the basis of such assistance should be." It is satisfactory to observe that, after a close study of existing conditions, the State assistance postulated does not exceed something in the nature of a grant in aid, supplemented by necessary changes of organisation and administration. The necessity will still remain for continued and increased generous contribution by those who have the power to give. After all, the voluntary system can only be saved if the public have the mind to save it.

The Significance of Sudden Cures.

To lose a sense of the marvellous is one of the penalties of advancing years; it is a sad day when the grown-up ceases to wonder at the great things of Nature and Art, and equally tragic when the physician is unimpressed by life and death. It is, indeed, a wonderful thing to feel the pulse beat again in response to some heroic remedy, to see the pallor of apparent dissolution replaced by the faintest flush of returning life. Doubtless such dramatic incidents are less common in everyday professional work than the long struggle against

disease, unrelieved by any particularly rapid alteration in a favourable or adverse direction. To most of us, in fact, a sudden cure, apart from the occasional striking turns in the course of acute organic affections, or the results of operative or manipulative interference, is suggestive of a hysterical or functional state; while what is unexpected, and therefore miraculous to the lay mind, is a therapeutic commonplace to the neurologist.

As all the world knows, rapid cures of hysterical disabilities have occurred with monotonous frequency, and, variable though the methods may be whereby they are effected, few will be found to deny a common factor in the underlying mechanism, with a knowledge of whose action an ever-widening circle of neurologists and psychotherapists are familiarising themselves, to the increasing benefit of the sufferers from psychogenic disease. None of those who thus daily come in contact with the manifestations of hysteria is likely to claim any supernormal powers beyond those of his fellows; on the contrary, intimate acquaintance with the why and the wherefore has reduced the "marvels" of psychotherapy to the level of cause and effect. It is, therefore, with some curiosity that we turn the pages of "Twenty Cures at Lourdes,"[1] a recently published translation, by two members of the Order of St. Benedict, one of whom has a medical degree. We find ourselves in sympathy with the assertion, both of the author in his introduction and of Sir BERTRAM WINDLE in his contributed preface, that the cases therein cited with some detail are to be judged on their medical merits by medical men, who are to be the final arbiters whether, as Sir BERTRAM WINDLE believes, "such cases are wholly outside the experience of ordinary medicine" and whether they "fail to follow recognised laws." We may select the case of GABRIEL GARGAM, since Dr. DE GRANDMAISON says it "is certainly one of the most interesting and extraordinary to be met with in the annals of Lourdes."

GABRIEL GARGAM, a post-office employee, was in a railway collision on Dec. 17th, 1899, was hurled violently many feet away into snow, and was not picked up till some seven hours afterwards. It was then found that he was "covered with wounds," had fractured his collar-bone, and was paralysed in the lower limbs. He came under the care of Dr. DECRESSAC, of Angoulême, who reported a year later that he had rigid paralysis of the lower extremities, with pronounced wasting of the same, loss of all forms of sensibility up to the level of the pelvis, exaggerated deep reflexes with ankle clonus, exceptionally brisk abdominal reflexes, slight bladder difficulty in certain positions only, and distinct pain on pressure over the second lumbar vertebra. The arms were normal, but the trunk was rigidly paralysed in extension. Six months later the same practitioner noted increasing emaciation, pains more or less all over, and similar objective signs to those just mentioned. On these data Dr. DECRESSAC made a diagnosis of amyotrophic lateral sclerosis, and pronounced the condition incurable. His partner, Dr. TEISSIER, diagnosed diffuse meningo-myelitis from compression of the cord, and Dr. DE GRANDMAISON, favouring the latter diagnosis, says: "In all probability the second lumbar vertebra is where the initial traumatism occurred."

Now it is superfluous to point out that any acquaintance with the elementary facts of neurology would enable the physician at once to exclude amyotrophic lateral sclerosis, in view of the complete loss of all forms of sensibility in the legs as far as the pelvis; that would be the last disease to be suggested to him from consideration of the facts connected with the onset of the affection in GARGAM'S case. The alternative diagnosis of compression meningo-myelitis is excluded with equal facility. A traumatic lesion at the second lumbar vertebra corresponds to the lower part of the conus medullaris and the cauda equina roots, and would produce an atonic paralysis with absence of the deep reflexes and with gross sphincter impairment. It is a simple impossibility for a compression at that point to give rise to a rigid paraplegia of trunk and legs with exaggerated deep reflexes and ankle clonus. Leaving these patently erroneous diagnoses, what are we to think of a rigid paraplegia involving the trunk muscles in which the abdominal reflexes are extremely active? The tyro in neurology knows that observation alone casts the gravest doubts on any diagnosis of organic pyramidal disease at all. In none of the reports is mention made of the plantar reflexes, an omission which, with others that will at once occur to the neurologist, renders the clinical description almost valueless and shows that no reliance can be placed on Sir BERTRAM WINDLE'S statement that "all the cases are fully dealt with in a clinical manner."

On such data as are given, however, anyone familiar with nervous disease would make a diagnosis of an ordinary hysterical paraplegia, nor is there a single symptom or sign in the account that is incompatible with that diagnosis. We are not in the least surprised, accordingly, to be told that during the procession of the Blessed Sacrament at Lourdes some twenty months, apparently, after the accident, GARGAM, who was lying on a stretcher, rose to a sitting position and exclaimed, "I am cured!" making a rapid convalescence. We are astonished, however, that the case should be cited seriously in support of the contentions of the Lourdes authorities. Dr. DE GRANDMAISON invites the criticism of the medical profession, and we have taken him at his word. One of the most extraordinary cases turns out to be one of the simplest. So far from its being wholly outside the experience of ordinary medicine the exact reverse is the case, and we should hesitate to waste time over such banalities were it not that the book challenges the accepted interpretation of the influence of psychical over physical states. Sir BERTRAM WINDLE says "in cures like that of GARGAM it is abundantly clear that there was no kind of suggestion," a rash statement to make when no hint is given of any psychological examination of the patient. GARGAM made a good recovery and has continued, apparently, in excellent health. Identical recoveries are being made daily by patients who have the good fortune to come into the hands of those who know their work, thanks to the immense impetus given to the study of the subconscious mind by the experiences of the war. It is because of exactly such cases that the teaching of clinical psychology and psychotherapy should be encouraged in the medical schools; thence will issue a generation of practitioners better equipped than their predecessors to deal with the protean manifestations of the mind diseased. When neurological diagnosis reaches a higher standard, and functional cases are recognised and treated by the expert practitioner long ere the disease becomes firmly established, pilgrimages to grottos will cease.

[1] Twenty Cures at Lourdes. By Dr. de Grandmaison. Translated by Rev. H. Bévenot, O.S.B., B.A., and Rev. L. Izard, O.S.B., M.R.C.S., L.R.C.P. With Preface by Sir Bertram Windle, M.D., F.R.S. London: Sands and Co. 1920. 7s.

Annotations.

"Ne quid nimis."

THE WORK OF THE NATIONAL PHYSICAL LABORATORY.

THE recently issued report of the National Physical Laboratory for the year 1919 is replete with medical interest in so far as it relates to departments engaged in the standardisation of instruments essential in practice. Apart from medicine the authorities—and the general board includes the leaders of scientific research in all directions—have been able for the first time to disclose the details of certain war work of a confidential character which curtailed the normal activities of the laboratory in relation to research and the tasks of standardisation. It was not possible, for obvious reasons, to give details bearing on war material in the reports made by the heads of departments, or to refer to the special work in progress. The report now presents some account of the war work undertaken and, while necessarily still incomplete, the particulars furnished indicate the importance of the duties discharged by the laboratory in relation to the war. The cataclysm has proved a catalyst in so many directions, and not least in stimulating the activities of the National Physical Laboratory.

Coming to work of medical significance, reference may be made to the standardisation of clinical thermometers. The laboratory was originally asked to arrange for the testing of 20,000 clinical thermometers per week, but it was soon realised that the number to be dealt with would be about 30,000 per week, and provision had to be made for this amount. This demand on the resources of the laboratory arose out of the Clinical Thermometer Order of the Ministry of Munitions in October, 1918. It would appear from the report that the average number of clinical thermometers rejected at the present time is slightly over 3 per cent., while at the beginning of the Order the number was about 5 per cent. This official movement has undoubtedly had the effect of making the clinical thermometer a very accurate instrument at the service of the clinician. The publication in our columns of a series of articles may be recalled for they drew attention to the importance of official standardisation in this matter.[1] These articles form an impressive memoir of the evolution of the mercury column as an index of temperature from about 1866 to the present time. It is also interesting to note that Sir Clifford Allbutt was the pioneer of the present small type of accurate clinical thermometer.

A number of problems connected with the optical abilities and disabilities of glass was also investigated by the National Physical Laboratory, and the results were most satisfactory, the work in this direction having established the important fact that this material can be made as well at home as abroad. Upon this it should follow that the manufacture of special glass for lenses involved in the construction of, amongst other things, microscopes, spectroscopes, saccharimeters, polarimeters, and photographic accessories will remain a home industry. Not less ahead was the work on radium testing. The number of samples of radium of high content tested during the year was 88, containing altogether about 6175 mg. of radium bromide of the approximate value of £80,000. Details as to the efficiency of the preparations submitted are given in the report. X ray investigation took a minor position in the laboratory's work owing to pressure in other departments in connexion with the war, but preparation is now being made in regard to the measurement of the absorptive qualities of materials used for protective purposes in radiography. There have been unnecessary martyrs in this field, and among them members of our profession have suffered and died not knowing what potentialities for evil were hidden in these radiations. Lastly, the progress of medical research is clearly dependent upon the accuracy of the laboratory apparatus placed at the disposal of the investigators, especially in the field of biochemistry, and the control which the National Physical Laboratory suggests in regard to the calibration and hall-marking of such apparatus will receive the approval of all scientific men, while the proposed standardisation of scientific glassware may, it is hoped, come into force in the near future. This is a good record of work, and the National Physical Laboratory is an important national institution.

[1] Investigations on Clinical Thermometry: Continuous and Quasi-Continuous Temperature Records in Man and Animals in Health and Disease. By G. Sims Woodhead, M.A., M.D., LL.D., professor of pathology, Cambridge; and P. C. Varrier-Jones, M.A., M.R.C.S., L.R.C.P., Foundation Scholar, St. John's College, Cambridge (From the Pathological Department, University of Cambridge), THE LANCET, Jan. 22nd, Feb. 5th, 12th, 26th, and March 4th, 1916.

ANTHRAX AND NOTIFICATION.

ANTHRAX is one of the occupational diseases of which the occurrence must be notified to the Chief Inspector of Factories. Poisoning by phosphorus, mercury, arsenic, lead, and toxic jaundice are the others. The result of notification of these diseases has been remarkable. Industry has expanded rapidly, but the diseases have simultaneously contracted in the last 20 years. Phosphorus poisoning has disappeared; mercury and arsenic only linger to cause a few cases of illness each year; lead poisoning is restricted within an ever-narrowing circle; toxic jaundice, due to tetrachlorethane and trinitrotoluene, only raised its head during the war to be promptly throttled by a well-planned attack. Anthrax alone has maintained its toll of victims; but even here the number of cases in proportion to those exposed to risk is far smaller than of old; and it is no longer the scourge to the woollen industry which earned for it the name of woolsorters' disease. That industry has combined to fight it; and a scientific scheme for disinfecting all possibly infected wool as it is imported bids fair ere long to free the industry from its old enemy. Anthrax, however, affects other animal products besides wool, as was demonstrated by the outbreak which recently occurred in this country and in America from the use of shaving brushes made from infected foreign hair. Strict precautions are now enforced to ensure disinfection of all such materials. Foreign hides and skins are other sources from which infection may arise, and precautions have to be observed in handling them. But the anthrax bacillus seems almost uncanny in its capacity for eluding disinfection and precautions. It will sneak unsuspected on horsehair through a carpet factory and infect the hand of a carpet-layer; or gaining access to wall plaster, it will attack a paperhanger; or, as in the case referred to recently in the House of Commons, driven from factory premises, it will lurk in skins in a warehouse to which regulations do not apply. Nevertheless, notification betrays its twists and turns, and enables the cordon of precautions to be drawn ever tighter. Here we see the value of notification of disease at its best, for it is only of value when followed up, when research is embarked upon to discover means of prevention, and when those means are enforced. Notification only indicates the field for inquiry; it is no panacea in itself. Without investigation and compulsory precautions notification only alarms without giving confidence.

SPIROCHÆTAL HÆMOPTYSIS.

THERE is a growing tendency to attribute many of the symptoms occurring in the subjects of pulmonary consumption to the action of organisms other than the tubercle bacillus. In the May number of the *American Review of Tuberculosis* (Baltimore: National Association for the Study and Prevention of Tuberculosis) Dr. A. N. Sinclair gives prominence to the part played by Vincent's spirochæte in the provocation of hæmoptysis in cases of pulmonary tuberculosis. He found this micro-organism in a large proportion of cases, and it was present in 256 out of 410 cases of pulmonary tuberculosis. Of the 256 positive cases, 71 per cent. were complicated by hæmoptysis, whereas of the 154 negative cases only 36 per cent. were thus

complicated. He also found that out of 238 cases of hæmoptysis 182, or 76 per cent., harboured the spirochæte, whereas of the 172 cases without hæmoptysis only 74, or 43 per cent., harboured the spirochæte. Thus, the presence of Vincent's spirochæte in the sputum makes hæmoptysis a comparatively probable complication. The author also argues that in the treatment of hæmoptysis the presence of this micro-organism is an indication for special restriction of exercise and general freedom. His contentions will certainly stimulate others to examine tuberculous sputum for the presence of a mixed spirochætal infection.

TARTAR EMETIC IN SURRA.

THE Agricultural Research Institute at Pusa has issued a bulletin dealing with the treatment of surra in camels by intravenous injection of tartar emetic. The author of the pamphlet is Mr. H. E. Cross, M.R.C.V.S., described as camel specialist at Sohawa, Punjab. Surra is a very fatal disease among camels, due to infection with trypanosomes. Mr. Cross, who has conducted a number of valuable investigations into other diseases of camels, injected six camels suffering from surra with a 1 per cent. solution of tartar emetic, and four of them were cured. Great care was taken to ensure the solution entering the vein, since in camels, as in human subjects, sloughing is liable to ensue if any of the solution passes into the subcutaneous tissues. The fluid was injected slowly at blood temperature. Mr. Cross found that 600 c.cm. of the solution could be given in the day if divided into three injections spaced out at 2–3 hour intervals. In four of the six camels treated no trypanosomes appeared in the blood after the injections.

METROPOLITAN WATER BOARD RESEARCHES.

WE have received the thirteenth research report issued by the authority of the Metropolitan Water Board from the chemical and bacteriological laboratories under the control of Sir Alexander Houston, Director of Examinations to the Board. An outstanding feature of this report is the study that has been given to the question of rapid filtration. This suggestion of speeding up is described as a contentious but most important subject, and by rapid filtration, we are told, is meant any apparatus, installation, or process, which filters at a much faster rate than is found in connexion with slow sand filters in which "washing" is effected by mechanical means. Without entering into the details of the process, except to say that it involves usually the use of a coagulant—e.g., aluminium sulphate—we may briefly refer to Sir Alexander Houston's opinion on the subject, which is, to speak generally, that in cases when a water is epidemiologically satisfactory but highly coloured, as in the case of moorland supplies, rapid filtration with the use of a coagulant achieves the most satisfactory results. He makes, however, important reservations, and asks whether it is permissible to filter stored water so rapidly, for though it may lead to material economic gain and the saving of filtration area, it is well established that ante-filtration or post-filtration sterilisation processes produce a water which is epidemiologically safe, innocuous, tasteless, and reasonably satisfactory from a physical and sentimental standpoint. The suggestion seems to be that so far rapid filtraton has not the evidence of experience behind it in regard to safety for the water-consuming public, though it might be combined with a chlorination process without adding seriously to the expense of treatment. The proposed changes in treating our raw water-supplies need to be very carefully studied lest any innovation is introduced at the price of health. The results of chemical analysis are, at all events, shown to be less satisfactory obtained with rapid filtration than with slow sand percolation, and the bacteriological results are not encouraging. Security, however, seems to reside in a chlorination process added to old-time procedure, and Sir Alexander Houston states that it is debatable whether the policy of substituting in connexion with new works a less expensive rapid for a more costly slow sand-filtration process is sound. The point has evidently arisen out of the increased demand of labour and cost of working materials. The use of chlorine has led to the nuisance of evil taste, but this bids fair to be overcome, while an interesting outcome of the water laboratory researches has been that when filtration has proved unsatisfactory this has been shown to be due not to floods, but to a seasonal development of diatoms governed by bright weather and temperature. The report is most interesting, and contains an admirable series of reproductions of photographs of deposits from raw and filtered supplies, demonstrating the efficiency or discrepancies of the filtration processes.

HEREDITARY SPASTIC PARAPLEGIA.

Dr. V. R. Mason and Dr. W. F. Rienhoff, jun.,[1] of the Medical Clinic, Johns Hopkins Hospital, report four cases of the rare hereditary disease of the central nervous system known as hereditary spastic paraplegia which affected members of one family for three generations. The condition was first described by Strümpell, who reported two cases in 1880, and a few years later was able to demonstrate the pathological basis of the syndrome. Since then the records of about 60 affected families have been published. The malady usually affects individuals in only one generation, but in seven of the families recorded characteristic symptoms were present in more than two generations. Ætiological factors, other than heredity, are not known. The symptoms may become manifest at any age, although it is characteristic of hereditary diseases of the central nervous system that the age of onset is about the same in individuals of the same generation. There is no evidence that sex plays an important rôle either in the occurrence or the transmission of the disease. The fundamental symptoms from which the disease derives its name is a spastic paraparesis which may involve the upper extremities to some extent after the condition has progressed for many years. The most important subsidiary symptoms are tremor of the tongue, as a rule intentional in type, disturbances of speech, optic atrophy, nystagmus, ocular palsies, bulbar disturbances, scoliosis, pes equinovarus, ataxia, muscular atrophies, and occasionally some mental impairment. Sensation and the sphincter functions are usually unaffected. The condition closely resembles both Marie's and Friedreich's hereditary ataxia in its ætiology and pathological anatomy. All three diseases begin usually about puberty, progress slowly to a certain point, and then become stationary. Moreover, typical or pure cases of any of the three affections are rare. Symptoms common to all three diseases have been observed, such as nystagmus, tremor, and pes equinovarus. In each disease there is a marked combined sclerosis of the postero-lateral tracts of the cord of the type characteristic of hereditary disease of the nervous system. The differential diagnosis is in some cases impossible, but in the majority the presence or absence of paraplegia, or ataxia, is distinctive.

EMBOLIC ANEURYSM OF PERIPHERAL ARTERIES.

EMBOLIC aneurysm of peripheral arteries is rare. In the *Glasgow Medical Journal* Mr. Douglas K. Adams has reported two cases which, by a curious coincidence, occurred in the same wards within a month of one another. In the first case the patient was a metal-polisher, aged 29 years. He was admitted on Dec. 3rd, 1919, complaining of dyspnœa of four years' duration. For some years he had "rheumatic pains in the legs" and the ankles occasionally swelled. On admission he was found to be poorly nourished and pale. The fingers were clubbed. The apex beat was in the fifth interspace an inch outside the nipple line, and cardiac dullness extended half an inch to the right of the sternum and to the upper border of the third rib. A soft blowing mitral systolic murmur was heard, and a

[1] Bulletin of the Johns Hopkins Hospital, June, 1920.

rough aortic systolic. The second aortic sound was almost replaced by a soft diastolic murmur. The pulse was of the water-hammer type. Over the lungs the percussion note was slightly impaired, especially at the bases, and râles were heard at the left base. On Dec. 10th the lower border of the liver was found palpable, and he complained of generalised rheumatic pains, but the temperature had not risen. Aspirin and sodium salicylate seemed to give relief. On the 16th he complained of pains radiating from the buttock into the left thigh, and on the 23rd a swelling of the size of a hen's egg developed between the great trochanter and posterior superior iliac spine. It was fluctuant and pulsatile. A blood culture was negative. Embolic aneurysm of the gluteal artery, due to ulcerative endocarditis, was diagnosed. The posterior division of the left internal iliac artery was ligatured and the swelling disappeared. After the operation the patient was troubled with vomiting, abdominal distension, and pain, and also with pains in the chest and dyspnœa. The pulse became irregular and fast, and he died on Jan. 3rd, 1920, from cardiac failure. At the necropsy the pericardium was found thickened and opaque, with fibrinous exudate on its surface. The heart was much enlarged, there being great hypertrophy of the ventricles. Both mitral and aortic valves bore numerous vegetations, some apparently recent. The root of the aorta showed signs of sclerosis, with some calcareous deposit. The lungs were adherent to the chest wall and diaphragm. On the left gluteal artery there was an aneurysm of the size of a hen's egg, containing laminated clot. In the second case the patient, a chauffeur, aged 33 years, was admitted on Jan. 30th, 1920. He complained of loss of power in the left arm and leg of three months' duration, which began suddenly in November, 1919. He had been a soldier for 15 years and contracted malaria and dysentery in India in 1906. He had an attack of "rheumatism" in May, 1915, and of pleurisy in France in October, 1918. Otherwise his health had been uniformly good. On admission he was well nourished but anæmic. The apex beat was in the fifth interspace just outside the nipple line and was diffuse and heaving, with a presystolic thrill. Cardiac dullness extended to the upper border of the third rib, the right sternal margin and three-quarters of an inch outside the left nipple line. The percussion note was slightly impaired over the manubrium. There were a loud mitral systolic murmur and a rough diastolic. At the aortic cartilage was heard a rough systolic murmur and the second sound was replaced by a soft blowing murmur. The arteries were somewhat thickened. The pulse was 96 and regular, but "water-hammer." There were left spastic hemiplegia with extensor response and paresis of the face. After a few days enlargement of the liver was noted. There was effusion into the left knee-joint. The temperature rose to 100° F. On Feb. 12th he complained of severe pain in the right arm, and paralysis of ulnar distribution with wasting of thenar and hypothenar eminences was noted. In the middle of the forearm towards the ulnar side a pulsatile swelling was found. Mr. R. B. Carslaw operated under local anæsthesia and found a fusiform aneurysm of the right ulnar artery to the sheath of which the ulnar nerve was adherent. As the general condition was unsatisfactory the artery was ligatured proximally and distally. Death occurred a few days later from failing heart. It is noteworthy that in both cases there was a rheumatic history and the blood culture was negative. Irving Simons,[1] in a review of bacterial endocarditis, gives a list of the recorded cases of embolic aneurysms. These include sciatic artery (one), ulnar artery (one), femoral artery (two cases) and popliteal artery (one).

[1] Quarterly Journal of Medicine, April, 1914.

BRIGHTON AND JUVENILE WELFARE.—The Brighton and Hove Council for Juvenile Welfare has decided to appoint a whole-time paid organiser at £350 per annum. Both municipal education authorities have voted a grant of £150 towards the work. The problem of juvenile crime is as difficult to face in Brighton as elsewhere, and the efforts of the council merit attention and support.

NATIONAL HEALTH INSURANCE:

SOME DEFECTS IN MEDICAL ADMINISTRATION AND THEIR REMEDIES.

A MEMORANDUM on some of the medical aspects of the National Health Insurance Act, drawn up by Sir James Mackenzie and the staff of the St. Andrews Institute for Clinical Research, has been issued as an appendix to the report of the Inter-Departmental Committee appointed to consider and report upon the form of medical record to be prescribed under the terms of service of insurance practitioners contained in the Medical Benefit Regulations for 1920. On the general aspects of this report we commented in a leading article last week. The memorandum has been drawn up with a view to indicate the principal defects in medical knowledge which exist at the present time and which impair the success of the Act, and also to indicate some steps which can be taken to remedy them.

Defects in Medical Knowledge.

1. *Diagnosis, especially of the early stages of disease.*—There is an idea current that diagnosis in the majority of cases is so simple that little difficulty should be found in recognising from the patient's symptoms the nature of the disease from which he suffers, and scheduling it under a definite classification. This is required for a variety of purposes, such as army statistics, club certificates, the Insurance Act, death certificates. Such diagnoses are, for the most, imperfect, and statistics based upon them are misleading, because the classification of disease is at present based largely upon morbid changes which have been discovered and studied after death.

The reason for this is that at one stage of medical history morbid anatomy held sway, and the obviousness of certain morbid changes discovered after death led to the belief that these changes indicated the real nature of disease. It was not recognised that many of these morbid changes were merely the terminal stages of a long preceding illness, and that during most of the time such structural changes were not necessarily present. The classification of the morbid anatomist was largely adopted by the physicians, who diligently sought (in the living) for the "physical signs" in order to correlate the signs during life with the morbid state found at death. In consequence of this attitude the present classification of disease in the living has been based upon the morbid anatomy of the dead, and has led to the conception that each individual's ailment can be classified according to a gross pathological and structural change.

The incompleteness of medical knowledge at the present time is clearly shown by the fact that a very large number of patients who consult their doctor and who are incapacitated from work do not suffer from any disease referable to the current classification, or one which can be detected by physical signs. They suffer from disabling symptoms not referable to the disease of any special organ. The cause of such symptoms is frequently unknown, and they therefore cannot be rationally treated. It is only in the advanced cases or in the acute infections that a diagnosis can be made in accordance with text-book descriptions. The majority of patients present few or no physical signs, and these may be mostly referable and due to the disturbance of organs not themselves the primary seat of disease.

The chief signs of the early stage of disease are the complaints of the patients called forth by some distressful sensation. The tendency has been, in the absence of physical signs of disease, to take the more prominent symptom or sensation and consider it to be the disease, and the object to which treatment should be directed, as neuralgia, dyspepsia, anæmia, palpitation, neurasthenia, &c. The use of terms such as these indicates nothing more than the presence of a symptom.

Careful inquiry shows that in the majority of such cases a number of other sensations or symptoms are present, referable to other organs of the body. For example, the patient may complain of palpitation. Inquiry will reveal other symptoms referable to the stomach and intestine, to the nervous and to the muscular systems. When these symptoms are gathered together they are found to show a disturbance of so many different organs that the conclusion is forced that there is a common cause which upsets the balance of the different organs and systems. In some cases the cause can be recognised and dealt with, as in the case of some localised infection, such as an abscess. In most cases, though a single cause of the widespread disturbance can be inferred, it is not possible to identify it.

Many of these causes are transient and are thrown off, as is the case in the trivial ailments which cause a temporary

incapacity. In other cases it would appear that the persistence of such a cause which at first merely impairs the functional activity of an organ may ultimately lead to morbid changes in structure, such as arterial disease, certain diseases of the heart, kidney, and stomach. If these earlier symptoms of disease are to be unravelled, it is necessary that the panel doctor should not be tied down to a diagnosis made in the terms of text-book medicine, and further, that he should be encouraged, for his own advancement in knowledge, to keep a record of each individual case, however trivial it may appear to be.

These records will at first be of little value for statistical purposes, but by forming a continuous medical history of each individual they will enable the earlier symptoms to be correlated with any disease which may develop later. In this way the knowledge at present wanting may be supplied. Recognising this defect in medical knowledge the doctor should not be requested to specify the nature of a patient's illness either in the routine records or when certifying his incapacity for work, unless the doctor recognises with fair certainty the disease from which he suffers. In a large number of cases this cannot be done, and for a doctor to make a practice of giving a name to a complaint in cases where he knows this to be impossible, is not only illogical, but demoralising, and inimical to that clearness of thought which is necessary for that recognition of the defects in knowledge which is the first step to remedy these defects. Where certifying in such cases a patient's unfitness for work, the mere statement that he is unfit should suffice with a reference to the principal facts observed. If further information be needed in particular cases the card index described below will afford it.

In place of the method at present employed for the recording of the patient's complaints we suggest that a system of index cards should be established which should be used in such a way that certain simple but essential facts are recorded, and that these cards should be available for reference both for administrative purposes and still more for tracing the history of the patient's ill-health.

It is not assumed that this method will at once be successfully employed. At first, many of these records will be so badly done that they will be useless, but some will be carefully done, and as the doctors become more experienced their value will constantly increase. If the suggestion given later be adopted, that students before graduation are instructed in the duties peculiar to panel doctors, these records will become of the greatest value, not only for the practitioner himself in his treatment of the case, but also towards building up new material of medical knowledge. The following plan for the observation and recording of the ailments of patients has been worked out at the St. Andrew's Clinical Institute, and is used by the panel doctors there, and we suggest that an explanatory notice in the following form should be sent to every doctor, and that cards should be supplied to him on the lines there indicated.

[*Instructions for the recording of cases.*—Doctors are requested to make a brief note of each patient. The purpose is to keep a record indicating the nature of the complaint. This record will be of value for reference in future illnesses, and will lay a basis for the detection of the early signs of disease. Further notes, added as the case progresses, will be of use in this way, and will also become a record of the effects of treatment.

If the doctor is interested in some disease, these records can be made fuller. The proposed method is provisional, and the Committee would be obliged if individual doctors would send their suggestions for such modifications as would render the method more useful.

Name. Age. Occupation.
Chief complaint.
Associated sensations.
Physical signs.
Provisional diagnosis.
Treatment.
After-history.

These records should be retained by the doctor, and, in cases of patients who transfer, the Insurance Committee should arrange for the transference of these case cards.]

2. *Defective knowledge of drugs.*—The administration of the Insurance Act involves a large expenditure for drugs, and it behoves legislators to have clearly in mind the present state of knowledge in regard to their use. An inquiry will reveal that there is no accurate knowledge as to the effect of a great many remedies, with the result that worthless drugs are given in the belief that they possess certain properties. A careful inquiry will often reveal that many drugs do not possess the properties attributed to them. Indeed, such an inquiry would reveal the uselessness of so many remedies that the money spent upon them is quite unjustified.

There are two difficulties which will for a long time hamper an intelligent therapy: First, the belief of the people that for each ailment a drug or remedy of some kind exists, and the natural desire that something should be given or done. The second difficulty is the belief of the doctor in the efficacy of his remedy. While the real cause of disease is hidden, and its removal therefore impossible, treatment will continue to be directed towards signs and symptoms. As no rational system of instruction in therapeutics is given in the schools, or can be given until the nature of disease and the action of drugs is understood, the doctor is driven for help to an empiric experience, guided often by the statements of the advertising chemist.

These difficulties should be recognised, and while they cannot at present be fully combated, a constant endeavour should be made to place therapeutics on a surer basis. This can be done by the encouragement of research, particularly amongst the panel doctors themselves. Most valuable help, no doubt, has come from the experimental pharmacologist, but what has never been sufficiently recognised is that the action of remedies on healthy organs is often different from that on the impaired or diseased organ. This has been clearly brought out in the case of the heart. For many years large numbers of observations, experimental and clinical, had been made to find out the action of drugs of the digitalis group on the human heart. It was not until it was recognised that such drugs acted in a different manner on the diseased heart from what they did on the normal heart that the form of heart disease in which they were of benefit could be clearly recognised, so that now they can be administered with precision to suitable cases, and withheld in the great number of cases in which they had been given hitherto.

The intelligent recognition of symptoms enables the doctor to watch the effects of his remedies, and as he is the individual who has the best opportunity, his services are necessary to the intelligent prosecution of this research. An arrangement by which his opportunities should be related to the laboratory investigator and hospital physician would render it possible to lay the basis for a rational pharmacopœia. This is no visionary suggestion, but one which has already been carried out on a limited scale with gratifying success.

As the vast number of panel doctors cannot undertake themselves such an inquiry, it is suggested that certain investigators should specially study those remedies most in vogue with the panel doctors, and after each drug has been carefully studied and its properties understood, and the cases suitable and unsuitable for its use have been determined, a short note, such as the following, conveying this information should be sent to each panel doctor:—

[*The use of digitalis.*—Digitalis is only of use in those cases of heart failure where the exhaustion of the heart is due to an excessive rate. It acts by slowing the rate, so that each beat is more efficient. There are only a few forms of increased rate in which it has this effect; when the heart's rhythm is regular and normal and the increased rate is due to some exciting agent, as fever, digitalis is practically without effect. Its use is specially indicated where the heart's rhythm is irregular as well as rapid, especially in the condition due to auricular fibrillation. Here the irregularity is very disorderly, small and big beats occurring with no kind of orderly sequence.

In such cases the drug should be given in full doses, and pushed till an effect is produced, the effect being a marked decrease in the heart's rate, nausea, or diarrhœa, or a sense of oppression across the chest. When these signs appear the drug should be stopped. If the heart's rate has decreased the drug should be given when the rate begins to increase in just sufficient amount to keep the rate between 70 and 80. If there is no decrease in the rate, but nausea, &c., then the drug should not be resumed. The tincture is the most serviceable form. It should be given to the adult in doses of 15–20 m., so that one drachm is taken in one day. The effect may be looked for in from four to seven days.]

The detailed results of these investigations should be published so that the reasons for the conclusion should be available. In this way there would be gradually built up a pharmacopœia of practical value.

3. *Defective knowledge of prognosis.*—A problem which constantly confronts a doctor, and one which is of the greatest importance in the working of the Act, is to assess the condition of the patient in relation to (1) his capacity for work, and (2) his future history.

(1) The present great deficiency of this knowledge was demonstrated during the war, when it was clearly shown that the knowledge did not exist which would enable doctors to classify men according to their capacity for work. It is manifest that, as the panel doctor has to certify a man's capacity or incapacity for work, there is urgent need for this kind of knowledge. The information necessary can only be gained from the systematic observation and examination of a large number of individuals carrying on their usual occupation, and this can only be done by the general practitioner, whose occupation provides the opportunities for systematic observation of this kind. The need for this kind of knowledge is forced upon every panel doctor. He has to decide whether a man is fit for his work. He may have to recommend him to receive sick pay, and he often has to determine whether the patient's occupation is detrimental to the health. It will be seen that his decisions involve the expenditure of large sums of money, and may influence the kind of life and occupation that many must follow.

(2) This misapprehension of the significance of signs and symptoms leads directly to much useless expenditure of money and the unnecessary interference with a man's work. This is particularly shown in the detection of some common

sign, as a cardiac murmur or albumin in the urine, medical knowledge not yet having advanced so far as to be able to recognise the significance of these signs, with the result that many healthy people are thrown on the sick list.

Investigations to remedy this defect should be undertaken by the general practitioner, as he is the only person who has the necessary opportunity. Steps should be taken to give facilities and instruction to such as are desirous to help in this matter. At the St. Andrew's Institute, investigations with this object are being carried out along the lines indicated, and it is proposed to collaborate with other doctors in this investigation. We suggest that from time to time brief notes of the results which are being obtained should be issued. The following is an example of the information which should from time to time be issued upon the prognostic significance of special symptoms.

[*The significance of systolic murmurs.*—It should be understood that the healthy heart can exhibit murmurs which are physiological in origin or are of so slight significance as to be negligible so far as the efficiency of the heart is concerned. These murmurs are always systolic in time and heard loudest at the apex, mid-sternum, or base of the heart. If the person can undertake such effort as we recognise to be compatible with his age without experiencing any distress (breathlessness or pain), and if the heart be normal in size or only slightly enlarged, then, for all practical purposes, the cause of the murmurs has nothing to do with any incapacity from which he may suffer.

If in response to effort the patient becomes exhausted, without breathlessness or cardiac pain, then the cause of his ill-health is not primarily cardiac, for exhaustion is not a sign provoked by a failing heart.]

The Teaching of the General Practitioner.

It is a remarkable fact that though the vast majority of medical students become general practitioners no attempt is made to teach them how to make use of their opportunities in general practice, and no hint is ever given them that the phases of disease which they will meet will be different from that which they have seen in the hospitals. There is an urgent need for a definite course of teaching and training students in their last year how they should conduct their practices as panel doctors. If there was a scheme by which they could learn how to question a patient intelligently, how to make short but accurate notes, how to watch the patient as he passes from one phase of disease to another, the working of the Insurance Act would, year by year, be greatly facilitated, while a great impetus would be given to the investigation of these dark fields of medicine which only the general practitioner can explore.

Central Clinics.

The recognition of the great defects in medical knowledge to which reference has been made—viz., diagnosis treatment, and prognosis—has led to the putting into effect a scheme to make good these defects. As it has also been recognised that these defects cannot be made good without the aid of the general practitioner, the basis of the scheme is to train him to make use of the opportunities which he and he alone possesses. It was also recognised that this object could be combined with means for affording the panel doctor facilities for the better carrying out of his duties towards his patients.

A building was therefore secured in which investigations could be carried on by the trained general practitioner, in association with the laboratory facilities for bacteriology, chemistry, and X rays. While each general practitioner examined his own patients, each one made a more particular study of a special subject, one, for instance, making himself familiar with the diseases of the nervous system, another with disease of the circulatory system, and so forth.

The system of specialisation at present prevalent enables the specialist only to see disease at a late stage. Moreover, as in ill-health there are reactions affecting several organs or systems, a man who restricts himself to the study of but one organ or system cannot acquire the power of detecting the primary cause of the patient's ill-health. We recognise that a general practitioner who makes a special study of the diseases of one organ or system is better qualified in that he has a wider experience, and can therefore take a broader outlook of his patient's complaint, besides having an opportunity for seeing the disease at an early stage.

In the St. Andrews Institute each panel doctor has a room, and arrangements are made for him to see his panel patients there. He has the use of the laboratories, and he can call upon his colleagues and consult with them on those cases of which they have made a special study. The great advantage of such a scheme is manifest. It is practicable, and the idea can be extended so that all the different health authorities could be in the same building and the facilities of one branch could be used by the other branches.

Methods Pursued at the St. Andrews Institute for Clinical Research.

1. Each clinician has a private room in the institute. This is reserved from 11 to 1 on Mondays, Wednesdays, and Thursdays for research cases. During the rest of the day each practitioner may use his private room as a private consulting-room. Two panel practitioners have adopted this plan for all their patients. They have thus the advantage of the use of the scientific departments whenever required. An index file and cards are provided in each room upon which brief notes are kept of each private or panel patient. These cards will, in time, form records of the life-history of each patient. In the event of a patient removing to another district these notes can be sent to his new attendant.

2. Cases for research are selected from his own practice by each member of the clinical staff. These are, in the first instance, seen by him, and he is at liberty to consult Sir James Mackenzie or any colleague at any stage of the case. If any special investigations are required, these are carried out by the staff of the special departments.

3. On Tuesday afternoons some special subject, arranged beforehand, is discussed by a general meeting of all members of staff.

4. On Friday afternoons the whole staff discuss the cases seen during the week, and any suggestions for investigation of any case made at that meeting are proceeded with and added to the record.

Summary.

1. The present phase of medical knowledge is defective, because the classification of disease is largely based upon pathological changes discovered after death, which bear little or no relation to the clinical manifestations of ill-health and no relation to the early symptoms of disease which occur before structural changes can be recognised.

2. Advance in knowledge along the right lines can only be effected by making use of the opportunities of the panel doctor.

3. Encouragement must be given to the panel doctor to make use of his opportunities for improving medical knowledge by: (*a*) Encouraging him to keep brief records of his cases and of the symptoms presented on the lines indicated; of the effect of treatment upon them, and of the continuous history of his cases. (*b*) By issuing to him from time to time notes upon the mechanism and the significance of symptoms.

4. By improvements in medical education in affording some instruction on clinical medicine as studied and treated in general practice as apart from its study under hospital conditions.

5. In view of notes of cases kept by a practitioner as indicated, certificates of fitness or unfitness for work should be accepted apart from a definite diagnosis in the numerous cases in which a true diagnosis is not as yet attainable.

6. By the coördination of workers, clinical and laboratory, the progress of medicine can be favoured, and the more skilful treatment of panel patients facilitated.

URBAN VITAL STATISTICS.

(Week ended July 31st, 1920.)

English and Welsh Towns.—In the 96 English and Welsh towns, with an aggregate civil population estimated at nearly 18 million persons, the annual rate of mortality, which had been 9·9, 9·9, and 9·8 in the three preceding weeks, was again 9·9 per 1000. In London, with a population of nearly 4½ million persons, the annual death-rate was 9·5, or 0·4 per 1000 above that recorded in the previous week, while among the remaining towns the rates ranged from 2·9 in Edmonton, 3·8 in Carlisle, and 5·2 in Lincoln, to 15·4 in Blackpool, 16·1 in Barnsley, and 16·8 in South Shields. The principal epidemic diseases caused 199 deaths, which corresponded to an annual rate of 0·6 per 1000, and comprised 90 from infantile diarrhœa, 37 from diphtheria, 33 from measles, 24 from whooping-cough, 9 from scarlet fever, and 6 from enteric fever. Measles caused a death-rate of 1·6 in Middlesbrough, but the mortality from the remaining diseases showed no marked excess in any of the towns. There were 1956 cases of scarlet fever and 1481 of diphtheria under treatment in the Metropolitan Asylums Hospitals and the London Fever Hospital, against 1911 and 1556 respectively at the end of the previous week. The causes of 23 of the deaths in the 96 towns were uncertified, of which 4 were registered in Birmingham and 3 in South Shields.

Scotch Towns.—In the 16 largest Scotch towns, with an aggregate population estimated at nearly 2½ million persons, the annual rate of mortality, which had been 12·1, 11·1, and 11·6 in the three preceding weeks, fell to 11·2 per 1000. The 235 deaths in Glasgow corresponded to an annual rate of 11·0 per 1000, and included 13 from small-pox, 6 from infantile diarrhœa, 2 from whooping-cough, and 1 each from measles, scarlet fever, and diphtheria. The 54 deaths in Edinburgh were equal to a rate of 8·3 per 1000.

Irish Towns.—The 107 deaths in Dublin corresponded to an annual rate of 13·4, or 0·6 per 1000 above that recorded in the previous week, and included 3 each from whooping-cough and from infantile diarrhœa and 1 each from measles and from scarlet fever. The 104 deaths in Belfast were equal to a rate of 13·1 per 1000, and included 4 from infantile diarrhœa.

THE ROYAL SANITARY INSTITUTE:

BIRMINGHAM CONGRESS, JULY 19TH–24TH.

LAST week we briefly reported the Sections of Preventive Medicine and of the Hygiene of Child Welfare, and we return now to an important discussion on

INDUSTRIAL EFFICIENCY AND FATIGUE,

which took place on Tuesday, July 20th, in the *Section of Industrial Hygiene.*

Three factors are coming to be recognised as fundamental in relation to the future development of medicine in this country: one is, that prevention is more important than cure; the second, that over-fatigue is the most potent influence conducing to ill-being, lowered resistance, and final breakdown; the third, that our national life is essentially based on industry, which is ever drawing into its net an increasing proportion of the population, male and female.

Mr. NEVILLE CHAMBERLAIN, as President of the section, in an inaugural address, gave an admirable and condensed sketch of the rise of industrialism and of the rank weeds of long hours and of the exploitation of child labour which sprang up alongside the good seeds of labour-saving devices and threatened almost to ruin the harvest. The lurid light of those early stages of development is now sinking into obscurity as the laws underlying human efficiency are coming to be known.

Professor E. L. COLLIS, a member of the Industrial Fatigue Board, summarised the position of knowledge to-day. He pointed out that, while the human body may be considered as a machine which requires fuel in the form of food to enable it to perform work, it is a living machine, the structure of which is in a constant state of metabolic activity, building itself up and breaking itself down; that the internal activity of building up—so-called rest—is a direct incentive to the external activity of breaking down or work; that work is even more necessary to health than rest; that fatigue, the result of sufficient work, is a healthy phenomenon, the forerunner of healthy rest; but that without sufficient rest over-fatigue results which manifests its presence as ill-being, physical and mental—a lowered capacity for work and for resisting sickness, associated with bad temper and discontent. Physical work which is performed by the muscles is directed by the brain; both muscular and mental activity steadily increase with practice which, if uncontrolled, would bring the organism to a state of excessive exhaustion. This state is guarded against by the mechanism which transmits messages to the muscles; here, in the synapse in the spinal cord through which the efferent impulses must pass, a block arises; the coming into existence of this block (while both muscular and mental activity may be increasing through practice) constitutes the onset of fatigue. Over-fatigue lowers industrial efficiency and the standard of well-being; thus the objectives of maximum production and maintained health depend on its avoidance. The interests of national productivity and of national health are in this matter the same—the avoidance of over-fatigue. When output is increasing hour by hour during the day, and day by day throughout the week, there can be no accumulation of fatigue; ill-health is then kept at arm's length. When output is falling off as the day lengthens, and as the week progresses, fatigue is accumulating, *joie de vivre* is diminishing, discontent is appearing. Much could be done to improve efficiency and prevent over-fatigue. Labour turnover, an economic waste which in factory employment alone places upon industry a yearly burden of some 40 million pounds, due to the rolling stones of labour trying to find round holes to fit into, is productive of much unnecessary inefficiency and over-fatigue. It can easily be reduced 70 per cent. and probably more by medical and psychological selection of workers for work, instead of adhering to haphazard, come-and-go-as-you-please methods of engagement by trial and error. Workers should be fitted to their work; taught their work; clothed for their work; provided with suitable food and stimulated to personal hygiene. Work should be fitted to the worker: ventilation made effective; lighting made adequate; tables, benches, tools and machines constructed to suit each worker; periods of work and of rest scientifically planned. What is required is a right understanding of work in relation to the human machine, and attention to this machine, its possibilities and reactions, its medical and psychological aspects. Then well-being and contentment, skill, and production will be increased, while chronic fatigue and discontent, inefficiency and poverty will be decreased.

Welfare Work in Industry.

Miss A. M. ANDERSON, Principal Lady Inspector of Factories, next dwelt on the progress which is being made, and pointed out how the newer welfare movement is a coördinated effort to improve the personal health and life of the industrial worker, an effort directed by Government orders based on scientific research. A new science and art of labour, and of its management, is coming to light, aimed at securing health and welfare in the workplace, and quantity and quality in output; aims rendered possible by "fearless work and hopeful rest," the result of whole-hearted coöperation between capital and labour. Here is hope for a true international, an international of industry; and it may be noted that in the field of research this era is dawning, for the Comité d'Hygiène of France, the American Committee on Fatigue, and our own Research Board are in close touch, M. Langlois and Professor Lee both attending a recent meeting of the board in London. Hippocrates said the art of healing and the "love of man"—the whole welfare of humanity—are identical. Here the nations can gather in amity in pursuit of investigations into humanity aimed at saving fatigue, lightening labour, ensuring safety, rendering first-aid, and ameliorating social conditions. Thus morbidity and premature mortality, bred of over-fatigue and sloth, will give way to health, the child of work and rest.

Mr. W. B. WELCH, welfare supervisor at Birmingham Small Arms Company, contributed a short paper of great interest not only for its contents but as being an instance of the useful work which can be done at individual factories by those possessing the spirit of inquiry. In particular he gave data which showed that the effect of gymnasium work on growing lads was to increase their stature by the time they reached the age of 18 by 3½ inches, their weight by 14 lb., and their chest expansion by 1¼ inches; and also that the tendency among boys to stay in employment, rather than to move on, increased with age from 14 to 18.

Other papers were also read, one by Dr. W. A. DALEY dealt with the physique and working capacity of Liverpool dock labourers, and another by Surgeon-Commander R. J. MACKEOWN was devoted to the health of seamen and the need for safeguarding it.

Three papers of particular medical interest read in other sections merit further notice.

PROTECTIVE VACCINES IN INFLUENZA.

In the *Section of Preventive Medicine* Dr. W. H. WYNN read a paper on the Use of Vaccines for the Prophylaxis and Treatment of Influenza. The true value of vaccines for prophylaxis against epidemic influenza cannot, he said, be established until the morbidity of a large sample of the population, inoculated *before* an outbreak, as compared with that in uninoculated controls is submitted to expert statistical treatment. At present there is no agreement between bacteriologists as to the true virus of influenza, and the use of a vaccine is necessarily empirical, but there is general consensus that a vaccine for prophylaxis or treatment should contain several strains of Pfeiffer's bacillus, pneumococci and streptococci. Lasting immunity requires large doses, but such doses may produce unpleasant local or general reactions. These are relatively unimportant when occurring in selected individuals or groups of individuals, such as soldiers, who can rest for a day or two after an injection. The production of a long period of immunity outweighs the trifling disadvantages. But when, as with influenza, it is desirable to protect as

many as possible of the general population, unpleasant reactions, if possible, should be avoided. Immunity during an epidemic period of a few months only is aimed at, and this may be obtained with smaller doses, which will not produce reactions sufficient to interfere with work. Where, however, reactions are not objected to, it would be wiser to give the larger doses. Improvements in the manufacture of the vaccine may, in the future, enable large doses to be given without discomfort, and the experience with vaccine suspended in oil is suggestive of this possibility.

Author's Experience.

Dr. Wynn's own preference has been for a vaccine containing equal numbers of influenza bacilli, pneumococci and streptococci of several strains, and, so far as possible, from primary cultures. At first he gave 100 millions of each as a first dose, followed by 200 millions in seven days, but he now advocates a first dose of 200 millions and a second of 400 millions. In several instances a third dose of 800 millions and a fourth of 1200 millions have been used. By giving three or four increasing doses there is less reaction than by giving two large doses, and the final dose is the same.

"Over 1000 persons were injected with this vaccine, and I have a record of the result in 680. Of these, only 14 developed influenza, 4 of these only after three months. In all, the disease was mild, and there was no pneumonia. With most of these it is unfortunately impossible to compare them with uninoculated controls. The vaccine was used by many doctors under various circumstances. A common practice was to inject all the other members of a household in which there was a case of influenza. In one village there were two large preparatory schools. In one no vaccine was used, and nearly every boy, master, and servant suffered from influenza. In the other, 75 boys and 38 adults were injected. All escaped except one master, who was injected after infection had occurred. In the village, in which influenza was very prevalent, 31 adults and 16 children were injected and all escaped. At one hospital 117 nurses and maids out of 170 were injected in the autumn of 1918, at the beginning of the outbreak. Of the 53 uninoculated, 25 had mild attacks in the previous June, and all escaped subsequent infection during the autumn epidemic. Of the 28 presumably unprotected, 14 suffered from influenza, 2 having severe broncho-pneumonia, and 1 died. Of the 117 injected, 112 had two injections and 5 only one. Of the 112, 2 had mild attacks. Of the 5, 1 had a mild attack and 1 severe broncho-pneumonia."

American Experience.

Dr. Wynn went on to summarise the experience of protective inoculation in America, where it was practised on a large scale. Rosenow used a vaccine with the formula—pneumococci, 3000 mill. (type 1, 1500; type 2, 2750; type 3, 3500; type 4, 1250); *B. influenzæ*, 500 mill.; staphylococcus, 500 mill.; *Streptococcus hæmolyticus*, 1000 mill. in 1 c.cm.; ½ c.cm. was given as a first dose, and then 1 c.cm. and 1·5 c.cm. at intervals of seven days. In institutions 8306 were injected three times and 9388 were uninoculated. The incidence of influenza among the inoculated was 31 per 1000 and among the uninoculated 200 per 1000. The incidence of pneumonia was 1·0 and 12·0 respectively. Among the general population 93,467 received three injections, the influenza incidence was 87·9 per 1000 and of pneumonia 4·4 per 1000, as compared with 281·8 and 21·0 per 1000 among the uninoculated. Taking all the results, the average mortality rate in the inoculated was one-fifth of that in the uninoculated.

Dr. Tonney, of the Department of Health, Chicago, using Rosenow's vaccine, reported that of 44,494 not vaccinated there were 1039 cases of influenza, with 95 pneumonias and 60 deaths. Of the 2584 vaccinated once there were 14 cases of influenza, but of 1636 receiving a second injection there were no cases. Among the vaccinated there were 3 cases of pneumonia, but no deaths.

Minaker and Irvine, in San Francisco, used a vaccine containing 5000 mill. influenza bacilli, 7000 mill. pneumococci (3000 mill. each of type 1 and 2, 1000 mill. of type 4), and 100 mill. *Streptococcus hæmolyticus* per c.cm., 0·5, 0·8, and 1·0 c.cm. were given at three-day intervals. The final dose was, therefore, 12,100 mill. organisms. The results are set out in the following table. The civilians were inoculated before Oct. 16th, 1918, three weeks after the epidemic began, and before it reached its height, and the marines before Oct. 20th. The results are given up to Dec. 1st, when the epidemic had subsided. The naval men were not injected until Nov. 15th.

—	No.	Influenza.		Mortality	
		No. of cases	Per cent.	No.	Per cent.
Uninoculated—					
San Francisco and Oakland	625,000	33,065	5·3	3035	9·2
Mare Island Navy Yard	8,232	1,296	15·7	65	5·0
Nurses and attendants in hospitals	530	186	33·8	4	2·1
Los Angeles	600,000	9,124	1·5	612	6·6
Inoculated—					
San Francisco civilians	1,080	14	1·4	0	0·0
Marines at Mare Island	1,950	35	1·8	1	2·8
Hospital men on duty in influenza wards	270	9	3·5	1	11·0
Naval Camp, San Pedro	3,100	53	1·7	0	0·0

Sherman, using a vaccine very similar to the one I have advocated, gave prophylactic inoculations to 9000 employees in large works in Philadelphia at the beginning of the epidemic, and only 5 were reported to have contracted influenza. He also gives the reports from 39 doctors using the same vaccine; 41,260 persons received one to four injections. Of these 963 contracted influenza, with 23 deaths, making a mortality rate of 0·57 per 1000 inoculated, as compared with from 5 to 25 per 1000 inhabitants in various parts of the country among those not inoculated. Wood, medical director of the Willard Storage Battery Co., of Cleveland, immunised over 3000 persons at the beginning of the epidemic. Less than 1 per cent. contracted influenza, and none died.

Watters, of Massachusetts, used a vaccine containing *M. catarrhalis*, pneumococcus, and *Streptococcus hæmolyticus*, of each 400 mill., *B. influenzæ* 100 mill. per c.cm.; 2 c.cm., 3 c.cm., and 4 c.cm. were given at three-day intervals. Of his laboratory staff of 14 10 received inoculations and all escaped; of the other 4, 2 had severe influenza. Public clinics were opened and inoculations given free of charge, and vaccine was sent to many boards of health and large works. Some of the results may be summarised as follows:—

—	Number.	Influenza, per cent.	Influenza mortality, per cent.
H. P. Hood Milk Co.:—			
Not inoculated	300	31·0	4·3
Inoculated	247	6·8	0·0
Boston Confectionery Co.:—			
Not inoculated	200	30·0	2·7
Inoculated	250	0·8	0·0
F. H. Roberts Co.:—			
Not inoculated	339	2·7	11·0
Inoculated	329	0·9	0·0
Allentown State Hospital:—			
Not inoculated	575	32·4	17·7
Inoculated	722	8·4	15·1

Watters, combining all his records, including the above, found that the disease incidence among the inoculated was approximately 3·5 per cent., while at the same time among others not inoculated and under similar surroundings the incidence was 28 per cent. The only deaths among the inoculated were among patients in the Allentown State Hospital, and of the 8 deaths 3 patients had only received one injection, and 3 only 2.

The Ministry of Health Vaccine.

In England Dr. Wynn considers there has been an unnecessary fear of large doses, and the formula originated by the War Office Conference contained only 60 mill. *B. influenzæ*, 80 mill. streptococci, and 200 mill. pneumococci in 1 c.cm., and it was advised that ½ c.cm. be given as a first dose, followed by 1 c.cm. after ten days. The initial dose was smaller than he used for treatment in influenzal broncho-pneumonia. Nevertheless, the result in the army showed that this vaccine gave some measure of protection. Leishman gave the following summary of results:—

—	Number.	Incidence per 1000.	Pulmonary complications per 1000.	Deaths. per 1000.
Inoculated	15,624	14·1	1·6	0·12
Not inoculated ...	43,520	47·3	15·3	2·25

It would be seen that the incidence of influenza among the non-inoculated in the army, 14·1 per 1000, was much less than the 50 to 300 per 1000 recorded in the American figures above, so that apparently a less severe type of disease was experienced in the particular army units concerned.

The vaccine now recommended and adopted by the Ministry of Health contains 400 mill. influenza bacilli per c.cm. instead of 60 mill. There is no explanation as to why this formula was adopted. It has met with much criticism, and the American experience, as well as that of those who have been using mixed prophylactic vaccines for years, seems to have been ignored.

It might be thought inadvisable, Dr. Wynn said, to inject persons suffering from chronic infections, but experience has shown that there is rarely any harm in injecting patients with chronic bronchitis, sinusitis, or arthritis. Pregnant women can safely be injected, and also infants, in spite of the advice from the Ministry of Health that the vaccine should not be given to children under 3 years of age. Children respond to vaccines very well, and he had no hesitation in giving suitably reduced doses to children under 3 years of age.

The second half of Dr. Wynn's paper was devoted to a consideration of vaccines in the treatment of a developed attack of influenza.

THE PROBLEM OF STILLBIRTH.

In the section devoted to the hygiene of maternity and child welfare Mr. BECKWITH WHITEHOUSE read a paper on the Medical Aspects of the Stillbirth Problem. The question, he said, was one of great national importance. The last report issued by the medical officer of health for Birmingham stated that during the year 1918 590 stillbirths occurred in the city—that is, 3·4 per cent. of all births. This figure did not include the large addition of babies who died within a few hours or days after birth from injuries and conditions directly dependent upon their entry into the world. What were the causes which underlay these facts? Were they sociological, depending upon such factors as housing, occupation, feeding, social status? Were they the result of constitutional disease in the parents or fœtus, or, on the other hand, were they directly dependent upon various obstetric complications?

Sociological Factors.

The Public Health Department in Birmingham had commenced an investigation into the causes of stillbirth, 440 cases having been followed up in schedules issued by the medical officer of health.

From these it appeared that there was little difference between the number of stillbirths in the poorer and least healthy parts of the city and that in the residential and healthiest wards. The average of the poorest was 37, and that of the healthiest 38. Industrial work on the part of the mothers did not appear to react unfavourably on the incidence of stillbirths, for in 411 cases, 242 of the mothers were occupied at home and 169 were employed industrially. Of the latter 64 were at work for six months or more of the pregnancy, whilst 17 only were at work for less than three months. Legitimacy was not an important factor, since in 333 instances the baby was legitimate. In only 24 was it illegitimate. Housing and overcrowding appeared to have some influence, for the proportion of stillbirths occurring in houses with from three to six rooms was 39·5, against 34 in houses with from seven to eight rooms or over. These figures were a strong argument in favour of increased institutional accommodation for pregnant women.

Constitutional Factors.

Syphilis was still regarded as being a very potent factor in the production of intra-uterine fœtal death. Mr. Whitehouse investigated collectively the obstetric histories of the women who had attended the venereal clinic at the General Hospital during the past year, and found that out of a total of 209 women 566 children had been born alive, whilst the stillbirths numbered 64, a proportion of 10 per cent. of the total. A fallacy was present in this gross number, since in many cases syphilis was contracted late in the obstetric life of the individual patient and cannot have had any influence upon the previous pregnancies. Ninety-three cases of tertiary syphilis had been collected, and amongst these women 293 children were born alive and 51 stillborn, a percentage of 15. A very striking feature was revealed during the investigation—namely, the very high infant mortality attached to the children of syphilitic parents from causes not necessarily actually due to the disease itself, but pointing to lowered general vitality. Although the pregnancy terminated in the birth of a living and often premature but viable child, and therefore could not be labelled "stillbirth," the infant did not survive, and therefore fell into that large group of "potential stillbirth." Syphilis in the parents, if untreated, therefore, not only increased the risks of fœtal intrauterine death, but to a marked degree diminished the chances of survival after birth. During the past year 25 women suffering from syphilis had been treated during their pregnancy at the General Hospital and admitted for their confinement. Amongst these patients no stillbirth occurred. By treating energetically throughout her pregnancy every expectant mother suffering from syphilis, either active or latent, it was possible greatly to diminish the risk of stillbirth from this cause.

Factors Concerning Fœtus and Delivery.

Mr. Whitehouse went on to deal with factors concerned with the fœtus and method of delivery, referring to the figures of the Birmingham Maternity Hospital for the past ten years.

During the period 1910–1919 inclusive 5591 infants were born in this institution. Of these 4876 were born alive and 715 dead, a percentage of 12·7. Of the latter a cause of antenatal fœtal death is assigned in 653 cases (91·4 per cent.) and unknown in 62 (8·6 per cent.). These results are expressed in Table I.

Live and Dead Births at Birmingham Maternity Hospital in Ten Years.

Total number of infants born		5591
Infants born alive		4876
Stillbirths		715 (14·6%)
Cause of stillbirth known		653 (91·4%)
Cause of stillbirth unknown—		
Macerated fœtus, &c.	62 (8·6%)	

Analysing the known causes of stillbirth in the 653 available cases it is possible to classify the material as shown in Table II.

Known Causes of Stillbirth.

Constitutional maternal diseases	18	Anomalies of umbilical cord	27
Prematurity	30	,, placenta	256
Toxæmia	94	Obstructed labour	192
Anomalies of fœtus	36		653

The undue proportion existing between these individual items led to a more detailed analysis of the actual pathological conditions present.

Analysis of Pathological Conditions.

Constitutional maternal disease:			
Mitral disease	11		
Chorea	1		
Cancer of cervix uteri	1		
Ovarian cyst	1		
Exophthalmic goitre	1	18	
Meningitis	1		
Transverse myelitis	1		
Encephalitis lethargica	1		
Prematurity:			
Prematurity	26		
Premature rupture of membranes	1	30	
Twins	2		
Triplets	1		
Toxæmia:			
Eclampsia	64		
Albuminuria	27	94	
Hyperemesis	3		
Anomalies of fœtus:			
Hydramnios	19		
Hydrocephalus	6		653
Anencephalus	7		
Atalectasis	1	36	
Fœtal ascites	1		
Spina bifida	1		
Fœtal heart disease	1		
Anomalies of umbilical cord:			
Prolapse of cord	25		
Cord round neck	1	27	
Thrombosis of cord	1		
Anomalies of placenta:			
Placenta prævia	205	256	
Antepartum hæmorrhage	51		
Obstructed labour:			
Obstructed labour (forceps)	85		
Craniotomy	50	192	
Malpositions (version, &c.)	49		
Cæsarean section	8		

In considering the items set forth above three facts are at once evident: (*a*) The very high fœtal death-rate from placenta prævia. (*b*) The danger to the child in obstructed labour, whether due to malposition or to disproportion between the fœtal head and pelvis, and whether forceps or version are employed in such a contingency. (*c*) The great risk to the fœtus in eclampsia.

Placenta prævia thus accounted for 31 per cent. of the total, a very high proportion, and this does not represent the total fœtal mortality, for an addition is required in respect of the children born alive, but who subsequently die from injuries received at birth. Of the 317 cases of placenta prævia admitted to the hospital 212 babies were stillborn and 33 died in hospital, giving a gross fœtal mortality of 77 per cent. The methods of delivery were as follow:—

Methods of Delivery in Placenta Prævia.

Method.	Cases.	Fœtal death.	Percentage.	Maternal death.	Percentage.
Version	211	193	91·4	9	4·2
Natural	35	16	45·7	0	0·0
De Ribes's bag	15	11	73·3	3	20·0
Rupture of membranes	11	9	81·8	0	0·0
Forceps	9	9	100·0	2	22·0
Cæsarean section ...	5	2	40·0	3	60·0
Vaginal Cæsarean section	4	2	50·0	0	0·0
Induction	2	1	50·0	0	0·0
Extraction of breech	2	1	50·0	0	0·0
Vaginal pack	1	0	0·0	0	0·0
Hysterectomy	1	1	100·0	1	100·0

The favourite method of treatment for placenta prævia is *version*, with a fœtal mortality in this complication of 91 per cent. and a maternal mortality of 4 per cent. The next method of election, if the case is so urgent that it cannot be left to nature, is the use of de Ribes's bag; here the fœtal mortality is 73 per cent. and the maternal 20 per cent. Mr. Whitehouse is of opinion that improvement can be effected in the treatment of placenta prævia by the more general substitution of Cæsarean section for version and the other methods at present in use. During the 10 years it was performed 162 times at the hospital, with varying indications, pre-arranged and emergency, the total mortality from all causes being only 5·5 per cent.

Risk to the child from obstructed labour could only be diminished in numbers by careful clinical examination before labour actually commences. Here antenatal clinics might play an all-important part. If the medical profession, as a whole, was too occupied to expend the necessary time in investigating individual cases of pregnancy the State must accept the responsibility of providing more antenatal clinics, where such work could be carried out by routine. The reward would undoubtedly be an appreciable lowering of the stillbirth figures.

DOMESTIC ANIMALS IN THE SPREAD OF INFECTION.

At the Conference of medical officers of health Dr. W. G. SAVAGE, medical officer of health for the county of Somerset, dealt with three examples of alleged association between human and animal disease.

Bovine mastitis was a rather common condition, the chronic form being usually due to the tubercle bacillus, or less commonly to actinomycosis. The prevalence of cows with tuberculous udders was probably round about 1 per cent. The association of the acute variety with human disease had required a good deal of unravelling. Of 35 acute cases investigated by Dr. Savage for the Local Government Board in 1907–08, over 70 per cent. were due to streptococci, 16 per cent. to staphylococci, 1 to *B. coli*, and the rest of doubtful bacteriology. The *Streptococcus mastitidis* closely resembled the pathogenic streptococci of man, as found in cases of sore-throat, in morphological and cultural characters, but differed from them in pathogenicity, being of low virulence to animals. And yet extensive outbreaks of sore-throat and other septic conditions had been traced to milk infected from cows suffering from mastitis. He had described over 20 outbreaks of these diseases due to milk, in a good many of which the cause was traced back to cows suffering from this condition, one such outbreak, which was fully investigated, involving over 600 cases and definitely traced to an infective cow. The explanation of this apparent inconsistency was that the cases in which a virulent type of organism occurred were examples of infection of the cow from a human source.

In 1911 and subsequent years outbreaks occurred in Boston, Chicago, Baltimore, and other cities which led to a differentiation of the human type of streptococcus in bovine mastitis by means of hæmolytic tests. The strains dangerous to man were always found to be hæmolytic, while the streptococcus of ordinary bovine mastitis was non-hæmolytic. Davis and Capps had shown that hæmolytic streptococci of human origin might cause mastitis lasting for several weeks in cows, the streptococci gaining access from an infection from the milker, whose hands were contaminated, perhaps, from a sore-throat. In an outbreak in Boston in 1917 (reported in January, 1920, by Brown and Orcutt) it was possible to identify the particular infective strain both from the mastitis fluid and from the sore-throats of the sufferers.

Outbreaks of Food-poisoning.

Food-poisoning outbreaks were all, or almost all, due to a secondary infection of sound food with members of the Gaertner group, the infecting agent being either *B. enteritidis*, *B. suipestifer*, or *B. aertrycke*. In a proportion of cases it was due to infection of the living animal with one of these bacilli.

In only a few of the recorded British outbreaks was there direct evidence of disease in the animals supplying the peccant food. In several cases where milk had been the vehicle the condition was traced back to infection of the cow with a member of the Gaertner group. The only two instances spread by meat from a diseased animal were those at Murrow and at Limerick. Continental outbreaks showed this association much more frequently.

Animals suffering from Gaertner group infection might recover from such conditions, but the bacilli persist, the animals acting as carriers, and undoubtedly a number of outbreaks had originated from the meat of sound animals being infected, by splashing and so forth, from the intestinal contents of such carrier cases.

In connexion with the secondary infection of food the importance of rats and mice must not be overlooked, since those animals frequently were infected with Gaertner group bacilli, and might act as a vehicle of infection.

Diphtheria and Cats.

That cats might be attacked with human diphtheria, or act as carriers of the bacilli, and so spread this disease, was a view very widely accepted amongst medical men and in the text-books. The author's investigations were along three lines. The examination of the throats of healthy cats and kittens quite unassociated with cases of human disease showed that in the swabs from the latter no organisms like diphtheria bacilli were detectable, but that from no less than five out of eight healthy cats bacilli were found growing on the cultivation media, which morphologically very closely resembled diphtheria bacilli, and which could not be distinguished from that organism in the films from the cultures. One cat re-examined three months later still showed these organisms. When they were isolated and their characters studied in pure culture it was manifest that they were not true diphtheria bacilli, nor were those tested pathogenic. All the cases mentioned above, where diphtheria bacilli were reported as found in the throats of cats associated with human disease, rested upon morphological appearances alone and never upon isolation and identification, and therefore were completely valueless in view of the above findings. A second line of inquiry was the examination of cats actually closely associated with human cases of diphtheria, and here, in several instances, as might be anticipated from the findings in healthy cats, bacilli morphologically indistinguishable from diphtheria bacilli were found in the cultures from the swabs. When isolated and fully investigated, however, none were found to be true diphtheria bacilli. The third line of investigation involved the experimental inoculation of kittens, to see if it was possible to infect them with diphtheria bacilli by natural channels. As many as 19 different experiments were carried out, and 10

different strains of human diphtheria bacilli were used, the virulence of four of them being fully tested.

"Massive and repeated feeding with highly virulent cultures (in one case on 11 occasions) were quite without effect. Kittens whose throats were inoculated by swabs with enormous numbers of diphtheria bacilll, either alone or mixed with staphylococci and streptococci grown direct from human cases of diphtheria, remained unaffected, and the bacilli had disappeared within 24 hours. The possibility that the failure to infect the kittens was due to the absence of a local nidus of growth was met by creating such a nidus by a preliminary scarification of the throat, and with other animals by painting with strong silver nitrate solution. Subsequent massive inoculation with diphtheria bacilli still failed to produce any infection or, what was remarkable, any persistence of the bacilli locally. The same striking fact was brought out by a series of nose-swabbings with heavy doses of diphtheria bacilli. In every instance the bacilli rapidly disappeared, and neither local nor constitutional symptoms resulted. These results were exceptionally uniform and concordant. It was found impossible either to infect the kittens or produce a carrier condition, even one of very short duration."

The whole series of experiments led Dr. Savage to the opinion that the common and widely accepted view that cats could suffer from a naturally acquired disease caused by the diphtheria bacillus was entirely without foundation. The reported cases of such an association were based upon insufficient examination and differentiation of the bacilli found, due to a failure to realise that a large proportion of healthy, normal cats contained in their throats bacilli closely resembling, and difficult to distinguish from, the true *B. diphtheriæ*.

TUBERCULOSIS.

Dispensary Treatment: the Ideal and the Real.

IN a report published as an appendix to the L.C.C. Report of the C.M.O. and S.M.O. for the year 1919 (P. S. King and Son, Ltd., price 5*s*.) there is an illuminating and admirably candid review of the work, and in some cases of the want of good work, at various tuberculosis dispensaries in London. The disclosures made certainly warrant revision of the conduct of a system on which the whole tuberculosis campaign hinges. One of the most valuable functions of the dispensary medical officer is visiting the patient in his home. Yet it appears that the tuberculosis officer attached to St. Thomas's Hospital is not allowed by the rules of the hospital to consult at the homes of patients. On this point the report is emphatic. "This is an unfortunate restriction, and it is desirable in the interests of efficiency that the rule should be revised." A fault of certain tuberculosis officers appears to be a lack of intensive study of the individual case. Cases in which the diagnosis is doubtful are kept dancing in attendance for perhaps a year; more and more are added to their number, till the machinery of the dispensary becomes clogged and there is no time for the physical examination of even a tithe of the patients. As the report puts it: "..... the observation cases cease to be observed, and the only thing that is done for them is that their medicine is repeated." The number of attendances made at these peccant dispensaries is accounted for mainly by the large number of children who receive treatment without diagnosis.

A far more efficient system was found to be adopted in other dispensaries, where great pains were taken to study each case intensively for a short period and to arrive quickly at a diagnosis. As for the actual treatment given at the various dispensaries, some seem to be perpetuating the pernicious "bottle-of-medicine" system. In one dispensary the drug bill amounted to more than £900, and the extent to which "drugging" still exists is illustrated by a hospital dispensary where 4569 prescriptions were dispensed for a total attendance of 4853. The medicine included 1785 bottles of cod-liver oil, alone or combined. In another case large quantities of virol were used. As the report points out, this wholesale "drugging" tends to make the patient rely more on the medicine and less on such essential matters as hygiene and diet. With regard to treatment by the general practitioner, the attitude of the tuberculosis dispensary officer seems to have undergone a marked change. Formerly he wished to treat every tuberculous patient himself. At present many such officers realise that it is essential to maximum efficiency that the general practitioner should not be excluded from the treatment of this disease. It also appears to be admitted that the treatment of the individual case by the tuberculosis officer does not yield materially better results than when treatment is left to the general practitioner. Many other aspects of the dispensary problem are discussed in this report, which does not mince matters, and which, instead of attempting to whitewash the backslidings of badly run dispensaries, goes so far as to name the worst managed districts and to indicate clearly the lines along which reforms should be made.

Insurance against Pulmonary Tuberculosis.

The Insurance Committee for Newcastle-on-Tyne has issued a survey of sanatorium benefit in the period July, 1912–December, 1919. The Committee's medical adviser, Dr. W. H. Dickinson, observes that in the majority of cases patients were not notified and relief was not sought till the disease was advanced. Thus, in 1918, 50 per cent. of the persons certified as dying of pulmonary tuberculosis had not been notified before death or had died within three months of notification. It was also ascertained that the average duration of illness before notification was 15 months. Dr. Dickinson makes some very pertinent suggestions in this connexion. In his opinion there should be some form of insurance against pulmonary tuberculosis, subsidies to consumptives being more urgently needed than pensions for persons over 65. As matters now stand, the expectation of life for pensioners of this age among the working classes is very much longer than for patients in whose sputum tubercle bacilli have been found. During the period under review only 66 per cent. of the insured persons known to have died from pulmonary tuberculosis in Newcastle applied to the Committee for treatment, and Dr. Dickinson is convinced that, were something more attractive than the ordinary "sickness benefit" available for these patients, an important step would have been taken towards securing the earlier diagnosis so essential to the patient and his family. Dr. Dickinson adds: "Obviously the consumptive who had been treated for months on end for 'bronchitis' would be far from satisfied when he learnt that he had been entitled to extra allowances, and had not received them. This dissatisfaction would soon bear fruit." With regard to the establishment of industrial colonies, as recommended by the Inter-Departmental Committee, Dr. Dickinson calculates that there are, roughly, 1200 cases of pulmonary tuberculosis living in Newcastle. Allowing for four contacts for each case, Newcastle alone would provide between 5000 and 6000 occupants for an industrial colony. Also, as about 200 new cases would for some years be arising annually, with 800 new contacts, the sum to be expended on the colony would be enormous.

Suggested Application of the Public Health Acts.

In the report of the Medical Adviser to the Belfast Insurance Committee for the year ending Dec. 31st, 1919, Dr. A. Trimble emphasises the relation to the incidence of tuberculosis of "real" wages, that is to say, the relation between wage and cost of living, as distinct from mere wage irrespective of the purchasing value of that wage. In a table showing the results of treatment it appears that 124 out of 1840 patients were cured or their disease became quiescent. In 738 cases there was a family history of tuberculosis, 113 patients having a father and 160 having a mother who had suffered from tuberculosis. The death-rate from pulmonary tuberculosis shows a fall from 2·7 per 1000 in 1918 to 2·1 in 1919. While the tuberculosis officer for Newcastle-on-Tyne advocates pensions for the tuberculous as a means towards stamping out the disease, the medical adviser to the Belfast committee advocates more drastic remedies. He writes: "What is urgently required is that not only should tuberculosis be placed on the list of infectious diseases, but the patient should be subject to all the provisions

of the Public Health Act, so that where a patient 'is without proper lodging or nursing accommodation,' and where the local authority is willing to provide for his institutional treatment, he should not be allowed to remain at home, a source of injury to himself and a menace to the health of those with whom he lives."

THE LEAGUE OF RED CROSS SOCIETIES: THE MEDICAL ADVISORY BOARD.

THE first meeting of the Medical Advisory Board of the League of Red Cross Societies was held at Geneva, at the headquarters of the League from July 5th to July 8th under the honorary presidency of Professor Emile Roux, director of the Pasteur Institute at Paris. Dr. Simon Flexner, director of the Rockefeller Medical Research Institute, served as chairman, and Colonel S. Lyle Cummins and Professor Giuseppe Bastianelli acted as secretaries.

The majority of the recommendations submitted to the Board by the Medical Section of the General Council of the League in March were approved. Those which will not be put into effect at this time were concerned chiefly with the establishment of laboratories and a museum, it having been decided that for the time being it would be wiser for the League to utilise existing facilities.

A Policy of Coöperation.

In general, the Medical Advisory Board outlined for the League a policy of coöperation with national Red Cross Societies and other health agencies, and of acting as a clearing-house for medical information. The latter function will continue to be accomplished through the League's publications and through the free medical information service of the Department of Medical Information. The publications include the *International Journal of Public Health*, a scientific organ; the *Bulletin of the League of Red Cross Societies*, a popular monthly, both published in four languages; and pamphlets of various kinds.

The support of national Red Cross Societies for the campaign against typhus and other communicable diseases in Poland was asked, and the coöperation of the League of Nations was requested.

The immediate organisation of a child welfare unit, and its despatch to some country which would engage gradually to take over its work and to duplicate its activities, was sanctioned. The work of this unit is to include the training of doctors and nurses, as well as the education of the public in child welfare. The Medical Advisory Board also suggested that the League of Red Cross Societies participate in creating or assisting in creating schools of puericulture or child welfare centres, and in providing scholarships for doctors and nurses in existing schools. A limited investigation into the causation of rickets in Vienna was recommended, if it seemed feasible.

Venereal Disease; Tuberculosis; Malaria.

Education in sex hygiene and antivenereal propaganda are to be continued by the Social Hygiene Department of the League, which also is to study the means by which it would be possible to reduce the cost of salvarsan; to promote regional conferences dealing with venereal disease; and to take measures to diffuse moral and physiological knowledge.

The antituberculosis measures to be undertaken by the League include the creation, in certain districts of several countries of Europe, of antituberculosis demonstrations. Each would carry out a preliminary survey of latent tuberculosis and open infection in the entire population of its chosen district according to age, sex, profession, and social groups; a statistical study of tuberculosis mortality and of the types and forms of the localisation of the disease; the establishment of an adequate number of dispensaries, run by specially trained physicians and visiting nurses; the organisation of open-air schools for children; and the education of the medical profession, as well as of the public, regarding the social fight against tuberculosis.

The proposed antimalaria programme of the League of Red Cross Societies in Spain was approved by the Medical Advisory Board, which also believed it suitable that the League study means of reducing the cost of quinine.

Sanitary Surveys.

The work outlined for the League's Department of Sanitation comprises the making of sanitary surveys, such as have already been carried out to a certain extent in Roumania and Slovakia; the promotion of public knowledge upon housing, pure water-supplies, and kindred sanitary subjects; a demonstration of the efficiency of chlorination in water purification; and the establishment of liaison officers in sanitation with the national Red Cross Societies.

National Red Cross Societies were advised to create, where possible, medical bureaux to maintain communication with the League of Red Cross Societies with regard to health. Adequate and full registration of vital statistics, international standardisation of forms and methods, and the stimulation of interest in statistical methods among physicians and the general public were urged. It was pointed out in this connexion that the major part of the collection and publication of statistics must remain under Government auspices, but that until international coöperation is fully established in this field the League of Red Cross Societies can do much effective work.

The Medical Advisory Board gave its approval of the work already carried out by the League of Red Cross Societies, and passed an especial resolution to this effect.

The different nations were represented on the Board as follows: Belgium, Dr. J. Bordet; Denmark, Dr. T. S. Madsen; France, Professor Emile Roux, Dr. Albert Calmette, Dr. Leon Bernard; Great Britain, Colonel S. Lyle Cummins, Sir Walter Fletcher, Sir George Newman; Italy, Professor Giuseppe Bastianelli, Professor Aldo Castellani; Japan, Professor Takasugi; United States, Dr. Simon Flexner.

Dr. William H. Welch and Dr. Hermann M. Biggs, of the American delegation, were unable to attend the conference, as was Dr. Carlos Chagas, of Brazil, the South American member of the Board. Professor Takasugi, while not a member of the Board, attended its sessions as a substitute for Professor Kinnosuke Miura, the Japanese representative.

VIENNA.

(FROM OUR OWN CORRESPONDENT.)

The Nationalisation of Drug Stores and Apothecary Shops.

THE Austrian Board of Health has laid before the National Assembly (our present House of Parliament) a Bill for nationalising all the existing apothecary shops and drug stores as well as pharmaceutical factories. The leading idea is that all such commercial enterprises should become property of the State, although they need not be run by the State. The present owner may rent or duly qualified government officials may conduct the business. All the existing State apothecary stores—in public or military hospitals—will be opened for public use. No new licence will be issued to private individuals; the old ones will be gradually cancelled. If an apothecary intends to dispose of his store he must offer it first to the State, and only if his offer is refused may he put it up for sale to private persons. The 20-fold average profit of the last seven years is the basis of the transaction. Besides this sum, the quantity of drugs, the stock, and outfit must be paid for by the State. If the possessor dies the same procedure holds good for the benefit of his family or heirs. The establishment of new drug stores in a certain place can be demanded by the municipality or the legal representatives of the medical profession, the apothecaries, or the "sick clubs" (Krankenkassen), and can be effected only by the State. The rentability of the existing drug stores in the neighbourhood must not be endangered by the new licence.

Every doctor of medicine in active practice is entitled to dispense such remedies as are required for urgent or immediate use or application, but he must buy them in a public drug store. Naturally this Bill, the leading lines of which have just now been sketched, meets serious resistance from the owners of dispensaries and pharmaceutical shops. Their chief argument is that by this Bill prices will be raised, although the chief reason for its introduction was the universal feeling of the population that they were overcharged by the dispensaries. On the other hand, all the persons who have taken up the study of pharmacy with a legitimate prospect of obtaining in due time a licence, and thus find a comfortable living, are naturally disappointed. Nevertheless, it is likely that the objections will be overcome and that the public will derive benefit from this procedure. The State will also gain by the new system.

Definite Settlement of Relations between Dental Surgeons and Dentists.

The present regulations pertaining to the work of technical dentists and dental surgeons were of such an unsatisfactory nature that they were a source of frequent annoyance and dispute between the patients, the profession, and the dentists of both kinds. Whilst the dental surgeons—they must be fully qualified medical men, with a normal medical training and graduation in this country—claim that they are entitled to do all kinds of work necessary for the treatment or repair of the teeth and the insertion of plates or artificial teeth in the mouth of a patient, the technical dentists demand that the doctors should limit their work to the purely medical or surgical part of treatment (filling of teeth, extraction, treatment of diseased roots). All the rest, including the manufacturing of artificial plates and teeth, the adaptation of such, the insertion of teeth into existing sockets, as well as all preparatory work necessary in that process, should be their own domain. But as such strict limitations are scarcely possible in actual practice—both kinds of work must needs overlap—there was always trouble. The technicians form a special guild, a corporation, of which doctors could not become members, and this corporation not only wanted to exclude doctors from all technical dental work, but demanded for themselves the right to perform in the mouth of patients all work necessary to make their apparatus fit and good for use. At last Government has worked out, with the coöperation of doctors and technical dentists, a Bill which will do away with all differences of opinion. The chief point is, that the existence of an independent corporation of technical dentists will cease. In future, the technician will be only a "hand" in the office of the dental surgeon. But the technicians now practising will be permitted to do certain minor pseudo-surgical work in the mouth with the exclusion of all bloody operations (especially the extraction of teeth may not be performed by them). No new licence will be granted to a technical dentist, and all these men practising at present will be controlled by the Board of Health. Only doctors of medicine will in future be permitted to treat diseased teeth and will be entitled to employ qualified technical dentists; these latter will be regarded as sanitary assistants. These men, and persons desiring to learn technical dentistry, will be able to do so in special schools attached to dental departments of public hospitals, or they will be able to "apprentice" with a duly qualified dental surgeon. By these means the technicians who until to-day have been in bona-fide practice will be able to continue their practice, whilst in about 20–30 years only doctors will treat diseases of teeth and mouth.

Post-graduate Lectures during the Summer Months.

A series of post-graduate lectures will be delivered during the months of August and September by a number of clinical assistants and privat-docents of the University of Vienna, the course including 6 to 24 lectures, open to graduates of all countries. Also special courses and classes will be arranged, lasting seven weeks respectively. The whole range of medical and surgical knowledge comes into review. Laryngology, otology, dermatology-syphilis, ophthalmology, pediatrics, and pathology will be chiefly dealt with. It may interest English readers to learn that American doctors are already coming to Vienna. At present several are working here in the clinics, and for the winter term, commencing in October, a considerable number have already booked places. Order and regular running of the hospitals and clinics has been ensured by this time, so that visitors may expect to find their time well spent.

Marked Decrease of Population Owing to the War.

The report of the census of the population taken on Dec. 31st, 1919, has recently been published and shows clearly the deleterious effects of the war. Austria has been cut down to a population of 6,182,450, whilst in the same area there lived before the outbreak of the war (1913) 6,575,000 persons. If the average increase had not been interfered with the population would have been about 6,872,000. The actual drop is about 700,000, due in some part to a very marked emigration. Many persons preferred to go to the new formed national states, partly for family reasons, partly from a business standpoint. The centres of depopulation are the large cities and towns. Vienna counts only 1,880,000 inhabitants, or 200,000 less than in 1913; the rural districts are not much worse off than before the war. But still even there the decrease is noticeable. A marked change has taken place in the relative numbers of the sexes. The actual war loss of male lives in the Austrian area amounts to a little more than 180,000, apart from the deaths due to malnutrition. The percentage of men and women bears at present the relationship 47 to 53, against 49·5 to 50·5 in pre-war time. The number of children is by 20 per cent. less than before; the birth proportion of sexes is now 109 girls to 100 boys. A sad outlook for the regeneration of the race!

Vienna, July 26th.

CERTIFICATION OF INSURED PERSONS IN IRELAND.

THE Irish Insurance Commission has issued an important letter to each medical certifier in Ireland. In the first place the announcement is made that the Treasury has agreed to raise the remuneration for certification by 40 per cent. This increase is given as the result of a demand made on behalf of the profession by the Irish Medical Committee, which refused as inadequate a previous offer of a 25 per cent. rise. The increase now given is roughly proportional to that recently granted to panel doctors in Great Britain, and inadequate as it is when the rise of prices is considered the Irish Medical Committee had no choice but to accept it. The increased remuneration is to date from Jan. 1st, 1920.

The Commission in its letter goes on to state that certain other matters in regard to certification came up for discussion between the Commission and the representatives of the Irish Medical Committee. The Commission complains of certain irregularities in certification at the hands of certain certifiers, and also with some emphasis of the laxness of local medical committees in investigating the complaints submitted to them. It appears that some certifiers have been in the habit of issuing certificates in mass, either retrospectively or prospectively, and the Commission points out how such an irregularity should be avoided. More serious attention is drawn to the issue of certificates without previous medical examination, an act which, even if no fraud be committed, is without excuse. Certain minor duties in regard to the notification of tuberculosis and other matters undertaken by certifiers appear to have been largely neglected.

It is understood that a new and more definite procedure in regard to the investigation of complaints has been agreed on. Much of the delay in the past has been due to the difficulty of assembling the Local Medical Committee in country areas. In future the duty of investigating complaints is to be delegated to a "complaints subcommittee" of three or five members, being in convenient proximity to a suitable meeting place. All the relevant facts, as far as known to the Commission, are to be submitted to the members of the committee in advance of their meeting. Both the accused certifier and a representative of the Approved Society bringing the charge is to have the right of being present at the meeting of the subcommittee, though the members come to their decision in private. Our Dublin correspondent, to whom we are indebted for these particulars, regards the procedure now outlined as fair and reasonable, and expresses a hope that the Local Medical Committees will take this part of their task seriously. It should, he adds, be remembered that the reference of complaints to the local committee is designed to protect the interests of medical men.

Correspondence.

"Audi alteram partem."

HELMINTHIC INFECTIONS AND PELLAGRA.

To the Editor of THE LANCET.

SIR,—May I be allowed a few words of comment upon the last paragraph of Lieutenant-Colonel P. S. Lelean's letter published in your issue of July 17th? Colonel Lelean writes that if the deficiency factor is only a contributory factor to a determining cause yet to find, the suggestion that the latter is to be sought in a helminthic infection (such as with *Ascaris*) is equally difficult of acceptance. Now, so far as regards the suggestion made recently by myself in this connexion, I have not considered the helminthic infection as the determining cause and the deficiency factor as only a contributory one. The matter is rather the other way round.

As will be clear, I think, to readers, both of my section of the Pellagra Report on the Turkish Prisoners of War, and of my letter published in your issue of May 28th, the question is whether a helminthic infection is to be regarded as an essential contributory factor, perhaps especially important as a predisposing cause; a dietetic deficiency being considered (in most cases, at all events) as the actual determining cause. As I wrote:—

"There is, of course, no intention of suggesting here that helminthic infections, by themselves alone, constitute the specific cause of pellagra; ..... such infections are known to be prevalent in many districts and countries where pellagra never, or only rarely, occurs."

May I illustrate by a rough analogy? Chronic, local irritation or stimulation is known to be often a most important contributory or predisposing cause of malignant disease; but this alone is not regarded as the immediate determining cause of malignancy, because a malignant growth does not necessarily supervene upon such a condition.

In the case of pellagra what I had in mind was that, as regards the extent of their responsibility, the two factors might perhaps stand in relation to one another in this way. The greater the adverse effect of helminthic intoxication (and this may not be the same thing as the heavier the infection itself), the less would be the degree of dietetic deficiency which would suffice to produce suprarenal inadequacy and pellagra, and vice versa. With reference to the Turkish prisoners, I stated in the summary of my report that the occurrence of *Ascaris* eggs was very general, not only amongst the pellagrins but equally amongst those who were liable at any time to become pellagrous. Just at the time I was at Kantara, the incidence of pellagra was becoming very high; and had not the labour been knocked off, one would hesitate to say how many of the "apparently healthy" Turks would not have gone on to show a manifestly pellagrous condition. I do not think, therefore, that my suggestion is so difficult of acceptance.

Is it known whether any of the prisoners of our M.E.F. and E.E.F. in Turkish hands showed symptoms of pellagra? And, if so, whether the cases occurred among the British or the Indians, or both? Because certainly the Indians would be more generally infected with helminths than the British. At any rate, as a first step I think it would be worth while for workers in pellagrous areas to endeavour to ascertain whether there is a distinct correlation between cases of pellagra and the occurrence of helminthic infections.

I am, Sir, yours faithfully,

July 31st, 1920. H. M. WOODCOCK.

THE TUBED PEDICLE IN PLASTIC SURGERY.

To the Editor of THE LANCET.

SIR,—The operating books, surgical records, and ward sisters' report books of the Queen's Hospital show the following statement of fact. The first occasion on which the pedicles of a face flap were definitely tubed occurred at the first operation I performed on A.B. V., the burnt seaman, the operation taking place on Oct. 3rd, 1917. These tubed pedicles progressed so well that the second stage operation, division of pedicle towards its base for use on the face, was performed on Oct. 17th, 1917 (Mr. H. C. Mallison for me). Captain J. L. Aymard's case, B. C. H., was operated on Oct. 18th, 1917, when he designed an original flap for making the nose and at the same time "tubed" it, in the same way as was my case. I am to blame in not informing Captain Aymard at the time he published his rhinoplasty case in your paper that he was not the first to get on to the principle of "tubing" the pedicle.

I am, Sir, yours faithfully,

H. D. GILLIES.

Queen's Hospital, Sidcup, August 3rd, 1920.

THE CLINICAL DIAGNOSIS OF DIPHTHERIA.

To the Editor of THE LANCET.

SIR,—I have followed with great interest the recent correspondence on the above subject. Being able to lay claim to considerable practical experience of both sides of the problem—the clinical and the bacteriological—I make bold to set forth some views on the subject. If it were always remembered that there can be no such thing as infallibility, clinical or bacteriological, there would be no occasion for "exclusive advocacy" by the holders of opposing views. In this matter of diphtheria diagnosis there is no time for opposition and argument. There is urgent need for coöperation and agreement. The clinical manifestations of diphtheria cannot be systematised with absolute certainty. However sure each of us may have been of his ability to dogmatise upon faucial lesions, sooner or later admission had to be made of a mistaken diagnosis. I think such must represent the experience of all fever workers. How could it be otherwise? So equally must bacteriological dogmatism be impossible where diphtheroid organisms are in question. Many times the clinician must be disagreeably surprised by the variety of bacteriologists' opinions where *B. diphtheriæ*, *B. hofmann*, and diphtheroids are under judgment.

Some such considerations may have been in Osler's[1] mind when he remarked that—

"The clinical and bacteriological conceptions of diphtheria are at present not in full accord. On the one hand, there are cases of simple sore-throat which the bacteriologists, finding the Klebs-Löffler bacillus, call true diphtheria. On the other hand, cases of membranous, sloughing angina, diagnosed by the physician as diphtheroid, are called by the bacteriologists pseudo-diphtheria or diphtheroid angina. The term diphtheroid may be used for the present to designate those forms in which the Klebs-Löffler bacillus is not present. Though usually milder, severe constitutional disturbance and even paralysis may follow these so-called pseudo-diphtheritic processes."

Surely the foregoing is a laboured attempt to make distinction where there is no difference. It frequently happens that a patient suffering from local and general symptoms and having all the clinical characters of diphtheria, cultures "negative" for as many days as are required to rid the throat of the false membrane. Is it to be wondered that "clinical and bacteriological conceptions of diphtheria are not in full accord"? The explanation of the apparent inconsistency is simple. A consideration of the histological structure of the false membrane will demonstrate the mechanical impossibility in given cases of a swab, lightly rubbed upon the surface, reaching the underlying diphtheria bacilli. The parts touched are swarming with pyogenic cocci, which, on culture by the bacteriologist, must give a "negative field." The cold scientific fact is that the particular swab submitted for examination is "negative." The cool conclusion that the patient involved has no diphtheria organisms in or about the fauces, hence cannot be suffering from diphtheria, is unscientific, and only serves to create a situation of professional embarrassment.

Scientific procedures cannot altogether supersede clinical observations. They must serve as valuable aids, and, if accorded that function, but not relied on

[1] The Principles and Practice of Medicine, pp. 192-193.

and acted upon slavishly, there will be no need to state such an apparent contradiction in terms as that—"though usually milder, severe constitutional disturbance, and even paralysis, may follow these so-called pseudo-diphtheritic processes." With the realisation that there need be no incompatibility between the bacteriologist's "negative" finding in an isolated throat swab and the practically undeniable presence of a clinical diphtheria, scientific judgment need no longer be questioned nor clinical prescience discredited.

To sum up, it may be said that some cases of diphtheria, probably the most severe, can only be diagnosed clinically, whilst others, certainly the mildest, can alone be proved by the bacteriologist. Apart from these extremes, the vast majority can be correctly and expeditiously diagnosed by correlating the clinical appearances with the bacteriological findings.

I am, Sir, yours faithfully,

JAMES LAW BROWNLIE.

Glasgow Corporation Laboratory, July 29th, 1920.

VENEREAL PREVENTION.

To the Editor of THE LANCET.

SIR,—With reference to the report published in THE LANCET of July 10th of the speech by the Minister of Health to the deputation received by him on July 2nd from the Society for the Prevention of Venereal Disease, we ask you to insert the following remarks.

Dr. Addison's reply was far short of convincing the deputation. He expressed his strong opinion that the Society's proposal would stir up intense and vehement opposition, and urged further his view that there was no basis of ascertained fact on which it was quite safe to dogmatise. The Society, on the other hand, holds that there is abundant evidence available regarding the successful use of medical prevention, on which positive teaching can be securely and justifiably based. It thinks, further, that the Minister's fear of agitation was exaggerated, and that public opinion is setting in the direction of the views it is advocating.

But a more important point for comment is the error made by the Minister when, in elaborating his main argument against applying the Society's preventive procedure to the civil population, he said that "they could not deal with a population of 40 millions on the same basis as Sir Archdall Reid, with iron discipline at his command, could deal with 2000 soldiers at one time." The information about Dr. Reid's experiences supplied to Dr. Addison was seriously wrong. These experiences were spread over nearly three years, among a fluctuating population of soldiers in barracks amounting to about 40,000 in all. He lectured to all the men arriving at barracks, in smaller or larger groups, sometimes even to one man at a time. Then he informed them that those who chose to run risks and wished to protect themselves could obtain the necessary disinfectants by application to the orderly, and he told the men how to use them. There was no "iron discipline"; in fact, no discipline at all. The men were warned and instructed in the same way that the Society thinks applicable to the civil population. There is certainly no necessity for either soldiers, sailors, or ordinary civilians to be "scientific" in order to carry out clear instructions based on scientific knowledge.

Lastly, we would note that the findings of the Inter-Departmental Committee, which Dr. Addison referred to as "a strong body of men whose advice he asked," have been already definitely challenged more than once, and that that Committee's report has been deemed by many competent critics to bear the mark of an insufficient inquiry and a foregone conclusion.

We are, Sir, yours faithfully,

H. BRYAN DONKIN,
JAMES CRICHTON-BROWNE,
W. ARBUTHNOT LANE,
G. ARCHDALL REID.

London, August 4th, 1920

DRUGS AND THEIR ACTIVE PRINCIPLES.

To the Editor of THE LANCET.

SIR,—The leading article in THE LANCET of July 24th dealing with the subject of galenicals *versus* active chemically separated constituents, raises a most important pharmacological point—the pharmacology of the parent substance in many cases cannot be entirely identical with that of the isolated principle. To give a homely illustration, can it be admitted for a moment that a few grains of caffeine in hot water represent the same thing as a cup of tea?

When, as was shown in a series of researches published some years ago from your Laboratory that in a tea infusion the alkaloid was in definite combination with tannin as a compound breaking up slowly in the organism, it seemed to me clear that tea must be a different thing pharmacologically from caffeine or its salts. The question appears to me to hang on the colloidal state. Galenicals all through are colloids, slowly diffusible; active constituents are crystalloids, rapidly diffusible. Examples of both are obvious. Morphia and its salts surely cannot be put precisely on the same pharmacological basis as opium.

I am, Sir, yours faithfully,

August 3rd, 1920. GALEN.

Parliamentary Intelligence.

HOUSE OF LORDS.

TUESDAY, JULY 27TH.

Health Resorts and Watering-places Bill.

Lord SOUTHWARK moved the second reading of the Health Resorts and Watering-places Bill, which had passed the Commons. The Bill proposed to enable local authorities to levy a 1*d*. rate for advertising health resorts and watering-places. This power was given to Irish local authorities in 1909.—Lord ASKWITH moved the rejection of the Bill on the ground that it was unnecessary and uneconomical.—After some discussion, in which several noble lords opposed the Bill, Viscount ASTOR (Parliamentary Secretary to the Ministry of Health) said that the Government did not officially adopt the measure, but in the Commons left it to the free vote of the House, and they proposed to follow the same course in their lordships' House.—On a division the Bill was rejected by 38 votes to 12.

THURSDAY, JULY 29TH.

Proprietary Medicines Bill.

Viscount ASTOR, in moving the second reading of the Proprietary Medicines Bill, said that it was introduced in fulfilment of an undertaking given by the Lord Chancellor on behalf of the Government last year. It had been framed on the recommendations of the Select Committee which reported in 1914. The Committee's recommendations were in the nature of a compromise, and were not based on either of the two conflicting views. This country was very much behind several of our dominions, as well as most other civilised countries, in its treatment of proprietary and patent medicines and surgical appliances. As an example of the way in which our public were victimised the Select Committee quoted the instance of a man who came with a certain instrument to this country and was reported to have made over £60,000 by its sale. He went to France and was sentenced to three years' imprisonment, as well as heavily fined, for trying to sell the same instrument. Additional legislation was certainly necessary here to deal with the matter. At the present moment there was no Minister or Government department which was responsible for protecting the public, or for seeing that the public did not suffer grievous injury. The Bill did not propose to protect the purse of the public, though possibly amendments might be moved later to strengthen the Bill in that respect. Injury might be caused in one or two ways. Sufferers who purchased and attempted to use these appliances and medicines very often postponed going to a proper medical practitioner while trying to treat themselves. The delay very often aggravated their ailment, sometimes very seriously. In other cases actual injury was caused through these remedies. They proposed to prohibit the advertisement and sale of remedies purporting to treat, cure, alleviate, or prevent diseases which were set out in the schedule—cancer, consumption, diabetes, certain diseases peculiar to women, fits, epilepsy, deafness—because they knew that serious risk was involved if sufferers tried to treat themselves by using a patent drug. These were serious complaints, and it was not in the public interest that people, haunted by fear, should

be encouraged to use these remedies. Too often they merely touched a symptom of the disease. A case was quoted in the report where a particular medical wine was advertised, and it was stated that if two wine glasses full were taken that was a sufficient amount to cause sleep. It was recommended for children in these words, "For colds, coughs and bronchial affections." It contained cocaine, or the elements of cocaine, and nobody would advocate the continuation of a law which allowed or encouraged people to purchase cocaine in order to make their children sleep when they were suffering from a cough. It was essential that they should take powers to deal with these evils. In a limited number of cases death was caused, particularly where remedies were used intended to produce abortion. A considerable number of remedies were advertised as being suitable for female irregularities. He was told that at the best these remedies were useless, and that too often the most serious consequences resulted from their use. It was impossible, he was told, to kill an unborn child without endangering the life of the mother. Some of these remedies were intended to give lead poisoning. It was quite true that you might kill the unborn child by this means, but too often they also killed the mother. These remedies also led to blackmail. A case was quoted of two men who had threatened to expose the purchasers of a particular remedy intended to cause abortion. The police intercepted 600 letters containing two guineas each from these unfortunate women, who were paying this money under a threat of exposure. If the Bill did nothing else but prevent this reprehensible practice they would be justified in trying to pass it. The Assistant Director of Public Prosecutions said it was almost impossible to prove fraud, and that practically the law was non-existent. They could not expect the purchaser of a remedy intended to produce miscarriage to come forward after having bought the remedy and say: "I bought this remedy in order that I should be able to commit a crime. I have not been able to produce miscarriage. I have been defrauded." He knew a case where a bottle of mixture was sent with the intimation that the powerful and certain action of the medicine contained in the bottle necessitated the warning that the contents should not be taken by those expecting to be mothers, as the medicine was very liable to cause a miscarriage. That was the way in which these drugs were brought to the notice of a large number of unfortunate women who too often in the past had availed themselves of them. He would quote a brief paragraph from the Report of the Select Committee which summarised, very briefly, the situation. The Committee stated:

> "For all practical purposes British law is powerless to prevent any person from procuring any drug, or making any mixture, whether potent or without any therapeutical activity whatever (so long as it does not contain a scheduled poison), advertising it in any decent terms as a cure for any disease or ailment, recommending it by bogus testimonials and the invented opinions and facsimile signatures of fictitious physicians, and selling it under any name he chooses on the payment of a small stamp duty, for any price he can persuade a credulous public to pay."

The Bill proposed that a register should be made on which every proprietary medicine and surgical appliance and the owners thereof should be registered. The sale of unregistered remedies was prohibited. Powers were taken, subject to the right of appeal, to remove the owner of a proprietary medicine from the register if his remedy was considered too dangerous to health. Powers were also taken to compel the owner to disclose the contents, the formula, the ingredients to the Government privately and in confidence. Heavy penalties would be imposed for non-disclosure. Further, they prohibited the advertising of remedies purporting to prevent, cure, or relieve the diseases which were set out in the Schedule. Clause 5 stated that the alcoholic contents of a patent medicine must be given on the label. Many of the medicated wines contained as much alcohol as some of the heaviest wines and twice as much as claret. A particular medicine referred to by the Committee which was recommended for use at the time of confinement was found on analysis to contain something like 60 per cent. of alcohol and the rest was apparently pure water. This was recommended as assisting confinement and producing fine and healthy babies. The Bill prohibited correspondence with the vendors, and the enclosure of literature with one remedy recommending the use of another remedy. They also prohibited the advertising of remedies suggesting that they were useful or could be used for procuring abortion. Clause 5 set out that all regulations must be laid before Parliament. The Minister of Health was made responsible for the supervision of the matters dealt with. In Clause 10 there was a definition of a "proprietary medicine." They excluded from the definition those proprietary medicines which were not advertised, pushed, or puffed in writing as being remedies, or having special therapeutic qualities. They proposed to exclude mixtures the composition of which was known, which were made by well-known and reputable chemists, and which were not pushed for sale on the ground that they had special therapeutic qualities. Nor did the definition include any recognised drug or preparation for which no monopoly was claimed. He knew that the press derived a large revenue from the advertising of patent medicines and surgical appliances, but he had too high an opinion of the press as a whole to believe that they would attempt to stop the passage of the Bill.

Lord ASKWITH said that the noble Viscount had not quite brought before their lordships the importance of this industry as a whole, which might be judged from the fact that last year more than £1,250,000 was paid in stamp duty to the Inland Revenue. He understood that there were about 10,000 retail pharmacists in the kingdom, apart from the bigger shops, with an enormous number of formulæ for making these proprietary medicines. The industry employed a very large number of people and produced a lot of articles, many of which were extremely useful to the community at large; and though everyone deprecated the remedies mentioned by the noble Viscount, yet there were other remedies which almost every man, woman, and child in the country used on and off in the course of the year. He was sure that there could not be anyone in their lordships' House who had not at times derived great advantage from taking a proprietary pill. He agreed that regulation was necessary, but a good opportunity should be afforded to those concerned to see that the Bill did not affect them unfairly.—Earl RUSSELL said if it was their object to see that the public were not defrauded the best thing was to state in the plainest language on the wrapper the contents of the medicine, and he would put down an amendment to that effect for the Committee stage. He thought that instead of the registered ingredients being kept secret they should be furnished to Parliament in a White Paper, so that they might be available to the press, or anyone who wished to see them. He doubted whether there was any such thing as a real secret in the composition of these medicines which was not known to the Pharmacopœia. He thought that it would be just as well if venereal diseases were included in the Schedule of the Bill.—Lord EMMOTT said he fancied that this Bill would probably need another very considerable bureaucracy. On the face of it it seemed to him rather un-English to demand a full disclosure of ingredients unless a very strong case could be made out for doing so. He hoped that the Bill would not be pushed in this period of the Session.—Viscount KNUTSFORD, while hoping that there would be no delay in passing the Bill, said he thought a man who invented a machine to help one to hear, or a good truss, ought to be allowed to advertise it.—After further discussion Viscount ASTOR replied briefly to the points raised, and the Bill was read a second time.

HOUSE OF COMMONS.

WEDNESDAY, JULY 28TH.

Medical Attendance for Soldiers on Demobilisation Furlough.

Captain COOTE asked the Secretary for War whether he was aware that if soldiers on demobilisation furlough fell so seriously ill that they were unable to move they were unable to report at the nearest military hospital, and therefore had to bear the whole of the expense of medical attendance until such time as they could be moved into hospital; whether he was aware that such men were not upon any panel and could not therefore secure free medical attendance from civilian practitioners; and whether in such cases he could cause a refund to be paid on account of medical expenses incurred.—Sir A. WILLIAMSON (Financial Secretary to the War Office) replied: Soldiers on demobilisation furlough are entitled to free military treatment from a military source. If the seriousness of the soldier's condition makes it impossible for him to report personally it would generally be practicable for a relative or friend to send the necessary intimation to the military authorities. If this were done the cost of private treatment incurred up to the time of removal to a military hospital would be refunded. If the soldier were too ill even to arrange for his illness to be reported, and his relatives were unaware of the correct procedure, a refund of the medical expenses would not be refused on that account.

New Dental Legislation.

Mr. RAFFAN asked the Minister of Health whether he could now state when it was proposed to introduce legislation for the purpose of carrying out the recommendations of the Departmental Committee on the Dentists Act, 1978.—Dr. ADDISON replied: The Bill will be introduced before the recess.—Mr. RAFFAN: Is the right honourable gentleman aware that the introduction of legislation on this subject was promised before the Whitsuntide recess, and can he say definitely if it will be introduced before the recess?—Dr. ADDISON: I expect it will.

Destruction by Rats.

Mr. GRUNDY asked the Parliamentary Secretary to the Ministry of Agriculture whether he was aware that rats were now consuming not only the actual sum of the bread

subsidy, which amounted to £45,000,000, but at the present price of grain nearly twice that amount; and whether he could state what action his department was taking to rid the country of these rodents.—Sir A. BOSCAWEN replied: I am aware that the depredations of rats are responsible for the loss of very considerable quantities of food, including grain. Any estimate of damage must necessarily be problematical, and I cannot vouch for the figure mentioned by the honourable Member. Since my department assumed responsibility for supervising the measures for the destruction of rats every effort has been made to instruct local authorities as to their duties under the Rats and Mice (Destruction) Act, and by personal instruction of their officers and the issue of pamphlets and notices to the press to call attention to the waste of food and damage to property caused by rats. As a result there has been a considerable reduction in the number of rats in certain parts of the country where effective measures have been taken, and it is to be hoped that such counties which have not as yet taken steps to organise schemes of rat destruction will shortly do so in view of the undoubted benefit and saving to the community of such action.

Suggested Railway Concessions for Disabled Service Men.

Captain BOWYER asked the Minister of Transport whether he was aware that many disabled ex-soldiers in this country were put to discomfort, and in many cases suffering, through having to travel in overcrowded carriages where it was impossible for them adequately to protect artificial limbs and stiff joints, and other effects of serious wounds, from jars and blows inevitable in view of the overcrowded state of the carriages; whether he was aware that in Belgium a reduction of 75 per cent. on all fares was granted to ex-Service men; and whether he would consider the possibility of adopting similar measures in this country, the effect of which would be to enable seriously wounded men to travel by better-class and therefore less crowded carriages.—Mr. NEAL (Parliamentary Secretary to the Ministry of Transport) replied: I was not aware of the fact mentioned by my honourable and gallant friend. The cost of any concessions in railway travelling must ultimately fall on other users. I do not think the method suggested is the most suitable way of dealing with the class of case mentioned, but I shall be glad to discuss the whole question with the honourable Member.

Condemned Food.

Major BARNES asked the Food Controller if his attention had been drawn to statements that, owing to the vigilance of the local inspector of food, there was recently discovered 60 tons of meat unfit for human consumption released from the stocks belonging to the Government for the food of the population of Newcastle-on-Tyne; whether the total amount of such food so detected during the past 12 months approximated to 800 tons; and if he would see that meat of a quality fit for human food was sent to that city.—Sir W. MITCHELL-THOMSON (Parliamentary Secretary to the Ministry of Food) replied: I am unable to state the total amount of food condemned at Newcastle during the past 12 months, but the total quantity since the beginning of this year is 164 tons, which includes a considerable quantity of home-grown beef condemned for tuberculosis. In at least two cases (representing approximately 30 tons of imported meat) the meat had been sold elsewhere by the Ministry and had been despatched by the buyer from the place of sale to Newcastle. The remainder of the cases are being investigated. All meat which is released by the Ministry for sale comes under the jurisdiction and the inspection of local inspectors in the same way as if it were privately owned, and there is no ground for the suggestion that the agents of the Ministry have attempted to issue for human consumption meat which was unfit for that purpose.

Slaughter Houses and Public Health.

Mr. DONALD asked the Minister of Health if he would state whether Ireland was represented on the Committee to consider and report on the legislative and administrative measures necessary to secure adequate protection for the health of the people in connexion with the slaughtering of animals for food; and whether Ireland would be included in the Committee's Report.—Dr. ADDISON replied: The answer to the first part of the question is in the negative. The terms of the Committee's reference limit its consideration to the problem as it affects England and Wales.

THURSDAY, JULY 29TH.

Causes of Death of Service Pensioners.

Mr. TYSON-WILSON asked the Minister of Pensions if he could give, approximately, the cause of death of the officers and men who had died since pensions were granted them.—Mr. MACPHERSON replied: I regret that in view of the regrettably numerous cases involved the information desired could not be furnished except with a very great deal of research and labour, which I cannot ask my staff to undertake.

The Dissatisfaction with the Pensions Appeal Tribunal.

Mr. CHARLES EDWARDS asked the Minister of Pensions if he would consider the appointment of a Committee to amend the Appeal Tribunal with a view to giving the greatest possible satisfaction to discharged disabled men.—Mr. MACPHERSON: I have pointed out that the Ministry of Pensions have no power whatever over the Pensions Appeal Tribunal. It is a body appointed by the Lord Chancellor. It was enacted because the House was not satisfied that the Ministry of Pensions would bring to bear on any particular case a fair mind. The House, having insisted on this tribunal being appointed, I am astonished to find any honourable Member coming to any other conclusion than that the Pensions Appeal Tribunal, which is an outside body, is the best possible one to consider these cases.—Sir E. CARSON: Is not this rule as to whether a particular complaint was contracted or caused by service in the war one that ought to be very liberally construed, having regard to the difficulties of saying when a disease commenced?—Mr. MACPHERSON: I quite agree. It is the case, and it is most difficult. As a matter of fact, appeal to this Pensions Appeal Tribunal has been granted in 70 per cent. of the cases.

Captain COOTE asked the Minister of Pensions whether, if a man was refused pension in the first instance on the ground of non-attributability and was subsequently granted a pension by an appeal board upon a decision that his disability was attributable to war service, the man was entitled to arrears of pension at the rate granted by the appeal board as from the date of his first application for a pension or only as from the date of his appeal board.—Mr. MACPHERSON replied: My honourable and gallant friend is under some misapprehension as to the powers of the Pensions Appeal Tribunals, to which I presume he refers. These tribunals do not assess the rate of pension, but only decide the question of attributability or the contrary. Where the tribunal finds in favour of an appellant arrears of pension are granted at the rate appropriate to the degree of disablement found by my medical advisers to have existed from time to time for a period not exceeding one year prior to the date on which the appeal was made.—Captain COOTE: Is there any reason why a pension should not be granted from the date of the first application?—Mr. MACPHERSON: The only reason—and it is a very sound one—is that Parliament has decided otherwise.

Dentures for Ex-Service Men.

Mr. BRIANT asked the Minister of Pensions if he would state what arrangements were made for the supply of dentures to ex-Service men who required the same by reason of illness or injury sustained whilst on service; to whom application should be made; and if they were supplied free of cost to the men.—Mr. MACPHERSON replied: The Minister has arranged with a panel of dentists throughout the United Kingdom for the free supply of dentures to those ex-Service men who, as a result of illness or injuries due to service, require them. Application should be made by the man to his Local War Pensions Committee.—Mr. BRIANT: Does the right honourable gentleman know that Pensions Committees in some cases say that they cannot do anything for these men?—Mr. MACPHERSON: If the honourable gentleman will give me any case where there is difficulty I will look into it at once.—Dr. MURRAY: Who will determine whether the man is entitled to dental treatment? Will the Local War Pensions Committee be able to settle that question?—Mr. MACPHERSON: I think that must be decided beforehand. If he is entitled to a pension he is entitled to free dentistry.—Dr. MURRAY: Then he must go before a Pensions Board?—Mr. MACPHERSON: I think so.—Dr. MURRAY: Why should not the Pensions Board be in a position to order the treatment without all this circumlocutory delay?—Mr. MACPHERSON: I do not think there is any circuitous route at all. I think it is a very direct way. If he is entitled to a pension I have arranged for a panel of dentists throughout the country to which he can go. If he submits his claim to the Local War Pensions Committee every assistance will be given to him.—Mr. SPENCER: Is the right honourable gentleman aware that men who have contracted some form of disease have been ruled by local boards to have contracted it before service, and what can he suggest to obviate that?—Mr. MACPHERSON: That is so, but a man has a very fair trial. He has a full right of appeal on a question of entitlement to a tribunal, which is independent of the Ministry of Pensions.

FRIDAY, JULY 30TH.

Dangerous Drugs Bill.

The Dangerous Drugs Bill was read a third time.

Ex-Service Men in Asylums.

Brigadier-General SURTEES asked the Minister of Pensions if he would state how many ex-Service men were inmates of asylums in the United Kingdom; whether they were treated in the same manner as pauper lunatics; and what was the cost to the country of such ex-Service inmates.—Major TRYON (Parliamentary Secretary to the Ministry of Pensions)

replied: The number of disabled ex-Service men classified as Service patients is about 5000. As the charges for maintenance of these patients vary considerably in different parts of the country, it would entail more work than I feel justified in imposing on my staff to ascertain the total cost to the country.

TUESDAY, AUGUST 3RD.

Condemned Meat at Newcastle.

Mr. GRATTAN DOYLE asked the Food Controller if he had read the report of the corporation veterinary inspector of Newcastle-on-Tyne for the four weeks ending July 10th, 1920, relative to the quantities of meat received in that city which had been found to be unfit for human food; and, if so, if he could give any explanation of the state of affairs there disclosed.—Mr. MCCURDY replied: I have read the report of the corporation veterinary inspector of Newcastle-on-Tyne for the four weeks ending July 10th. I find that during that period a certain quantity of home-grown beef was found to be tuberculous and accordingly condemned. A large quantity of imported meat was also condemned, consisting partly of offals which had been brought in on transshipment from the Continent on private account, and partly of carcasses also sent on private account which appear to have been unsound for some time. Certain cases of rabbits were also condemned, which formed part of surplus army stock for which it had been found impossible to effect a sale. I am satisfied that the utmost vigilance is being exercised by the sanitary authorities at Newcastle-on-Tyne, and the honourable Member may rest assured that the Ministry of Food is doing everything in their power to assist them.—Dr. ADDISON (Minister of Health) said that he was making inquiries as to the position in regard to Newcastle, and will communicate with the honourable Member.

Children from South-Eastern Europe.

Mr. RONALD M'NEILL asked the Secretary for the Home Department whether the operations of the committee who were bringing to England children and young persons from Hungary and other parts of South-Eastern Europe were being conducted under his supervision and control; if he would say how many such children and young persons it was intended to bring to this country; whether stringent precautions were being taken to prevent the introduction of infectious disease; where and under what conditions were these immigrants being accommodated; whether any adults were being admitted with the children and young persons; and whether any similar hospitality and charity were being offered in England to children from allied countries who might be as much in need as children of late enemies.—Mr. SHORTT replied: The work of the committee is not supervised or controlled by me. 456 children from Vienna have already arrived and 400 more from Budapest are expected shortly. That is all I know of at present. Careful medical examination of the children before they start for this country is made under the supervision of a medical officer of the Ministry of Health, and on arrival they are placed in quarantine in a camp near Richborough. In due course they are distributed to various parts of the country, the whole process being supervised by the Ministry of Health. No adults are being admitted with the children. A Manchester committee has recently asked for and obtained permission to bring over a number of French children from the devastated areas of France for a period of recuperation in this country.

The Services.

ROYAL ARMY MEDICAL CORPS.

Major J. S. Dunne to be acting Lieutenant-Colonel.

Temp. Capt. A. Brown relinquishes the acting rank of Lieutenant-Colonel.

Temp. Capt. A. Farquhar relinquishes the acting rank of Major.

To be Captains: Capts. G. K. Maurice (from T.F.), D. McVicker (late temporary Captain, R.A.M.C.); Temp. Capts. A. E. Drynan, J. W. Malcolm, W. C. Connell; Lieuts. (Temp. Capts.) J. A. Cowan, J. P. Macnamara, J. W. Hyatt, T. Stanton, T. Parr, A. P. Draper, J. R. S. Mackay.

To be Lieutenants and to be Temporary Captains: Capts. R. R. Evans and F. K. Escritt (from Spec. Res.); Temp. Capt. L. Handy.

Hon. Capt. C. A. Hutchinson, late R.W. Kent R., to be Lieutenant.

Officers relinquishing their commissions:—Temporary Majors retaining the rank of Major: J. P. Campbell, R. Worth. Temporary Captains granted the rank of Major: H. H. O'Heffernan, D. C. McCabe-Dallas, D. Gillespie, P. Murphy, J. P. Mathie, A. Topping, (Acting Major) J. A. Mackenzie. Temporary Captains retaining the rank of Captain: J. A. Bateman, A. C. Greenwood, A. C. Wilson, F. C. Watson, R. C. De Lacey, G. B. McTavish, H. R. Hurry, A. M. Niven, G. Maclean, E. Tanton, A. J. C. Tingey, T. W. J. Childs, A. S. Sieger, A. W. C. Bennett, H. C. Hopkinson, B. G. H. Connolly, P. S. MacLaren, J. V. O. Andrews.

SPECIAL RESERVE OF OFFICERS.

Capt. A. H. Habgood relinquishes his commission and is granted the rank of Lieutenant-Colonel.

Officers relinquishing their commissions:—Capt. E. N. H. Gray. Captains granted the rank of Major: F. Crosbie, J. Gossip. Captains retaining the rank of Captain: R. Chevassut, R. H. Yolland, J. H. Davison, A. D. Gorman, T. H. McLeod, W. H. Palmer, D. J. Thomas, J. Kinnear, W. W. Nicol, P. T. Jones, J. W. Bowman, E. G. Fishe, A. B. Dummere, D. Stewart, W. C. MacKinnon, L. Walker, J. N. Jamieson, A. Black, J. Liddell, E. V. Beale, A. O. Bolton, D. Cameron, W. M. Casper, C. A. Harvey, R. B. Hick, R. L. Robinson.

TERRITORIAL FORCE.

Major H. A. T. Fairbank resigns his commission and is granted the rank of Lieutenant-Colonel.

Capt. A. K. Maclachlan resigns his commission and is granted the rank of Major.

INDIA AND THE INDIAN MEDICAL SERVICE.

Lieut.-Col. H. B. Melville, Residency Surgeon, Kashmir, has proceeded on leave owing to ill-health; Lieut.-Col. McIver Smith officiates. Major C. A. Gourlay has been appointed Civil Surgeon of the 24 Parganas and Protector Emigration and Superintendent Emigration, Calcutta. Lieut.-Col. A. Leventon has been granted six months' leave. Lieut.-Col. E. L. Perry, Deputy Sanitary Commissioner, Punjab, is appointed Sanitary Commissioner, vice Major W. A. Justice, Madras Government. Capt. J. S. S. Martin to hold Civil Medical Charge of Roorkee, in addition to his own duties, vice Capt. J. Cullonan, R.A.M.C. Major P. Goil, on reversion from military duties, has been appointed Civil Surgeon, Raishaki, vice Dr. R. S. Ashe. Major A. E. J. Lister, Professor of Physiology, King George's Medical College, Lucknow, has been granted combined leave for eight months. Major W. Lethbridge has been granted an extension of leave for six months. Lieut.-Col. H. Smith, Amritzsar, has been granted one year's leave. Capt. Charters has returned from military duty and is posted to Umbala.

I.M.S. Ex-Officer's Rank.

A Government communiqué announces that an officer in the I.M.S. holding a permanent or temporary commission whose service has been satisfactory throughout shall be granted permission to retain his rank on demobilisation. If, however, he held higher acting or temporary rank during the war for a minimum period of six months, or if his service on the active list terminated as the immediate result of sickness or wounds caused "in or by" the Service while holding the higher acting or temporary rank, he will be permitted to retain rank equivalent to such acting or temporary rank.

DEATHS IN THE SERVICES.

Surgeon-General William Gerard Don (retd.), who died at his residence, Canfield-gardens, N.W., on July 27th, in his eighty-fifth year, served as a medical volunteer in the flagship *Duke of Wellington* in the Baltic Fleet and at the battle of Sveaborg in 1855. He graduated M.D. at the University of Edinburgh in 1857, joined the Army Medical Service in the following year, and served in Central India during the Mutiny, being present at the actions with Tantia Topee at Rajpore and Beilkara (mentioned in despatches). In 1882 he was employed in fitting out hospital ships for the Egyptian Expedition. For 17 years he was senior medical officer to the London Recruiting Staff. Surgeon-General Don, who retired in 1885, was president of the Caledonian Society of London and a life-governor of the Royal Scottish Corporation.

THE HONOURS LIST.

The following promotions and appointments of medical officers for valuable services rendered in connexion with operations in Afghanistan are announced:—

C.S.I.—Maj.-Gen. H. Hendley, I.M.S.

C.I.E.—Lt.-Col. H. D. Packer, R.A.M.C.; temp. Lt.-Col. J. F. Haswell, R.A.M.C.; Maj. A. F. Babonau, O.B.E., I.M.S.

C.B.E.—Lt.-Col. (acting Col.) H. Boulton, I.M.S.; Col. P. Carr-White, K.H.P.; Lt.-Col. J. G. Gill, D.S.O., R.A.M.C.

O.B.E.—Capt. (acting Lt.-Col.) P. B. Bharucha, D.S.O., I.M.S.; Capt. H. S. Blackmore, R.A.M.C.; Maj. C. E. Bulteel, I.M.S.; Maj. (acting Lt.-Col.) A. Cameron, I.M.S.; temp. Capt. P. J. De Sousa, I.M.S.; temp. Lt. B. N. Gupta, I.M.S.; Capt. (acting Lt.-Col.) J. P. Huban, I.M.S.; temp. Capt. R. W. Murphy, R.A.M.C.; Capt. R. B. Myles, R.A.M.C.; Capt. F. H. B. Norrie, R.A.M.C. (S.R.); temp. Capt. A. P. Pillay, I.M.S.; Capt. and Bt. Maj. C. Ryles, R.A.M.C.; Maj. (acting Lt.-Col.) W. W. Browne, R.A.M.C.

M.B.E.—Temp. Capt. Y. B. Ranade, I.M.S.

To be Brevet Lieut.-Col.—Maj. R. S. Kennedy, D.S.O., M.C., I.M.S.

To be Brevet Major.—Capt. G. A. Blake, R.A.M.C.; Capt. (temp. Maj.) T. A. Hughes, I.M.S.

D.S.O.—Capt. and Bt. Maj. (temp. Maj.) E. E. Doyle, I.M.S.

M.C.—Capt. J. E. Carpenter, R.A.M.C. (S.R.); Capt. D. F. Murphy, I.M.S.

CALEDONIAN MEDICAL SOCIETY.—The annual meeting of this society was held in the Prince Charlie Room of the Public Library, Derby, on July 24th, under the presidency of Dr. Rutherford Macphail. The society makes a practice of holding annual meetings alternately in England and Scotland, but no annual gathering had actually occurred since 1914. Conditions of membership are Celtic blood and the possession of a university degree. The society, which has a membership of 300 in addition to some 25 honorary members belonging to other professions, gives special attention to old Celtic literature in relation to medical science. Dr. Macphail took as the subject of his address "Derby and the 'Forty-five.'" The annual dinner was held the same evening, when the toast of the society was proposed by Dr. F. Milnes Blumer, Mayor of Stafford. The next annual meeting will be held in Edinburgh, under the presidency of Emeritus Professor William Russell.

Medical News.

UNIVERSITY OF CAMBRIDGE.—At recent examinations the following candidates were successful in the undermentioned subject:—

DIPLOMA IN MEDICAL RADIOLOGY AND ELECTROLOGY.

Part I., Physics and Electrotechnics.—William Wallace Boyce, John Prichard Bracken, Noel Hawley Michael Burke, Henry Warner Collins, George Eldridge Dyas, Thomas Garfield Evans, William Christopher Long, Geoffrey Trevor Loughborough, Hector Bruce Mackenzie, Thomas Marlin, Harry Carew Nott, Claude Mallinson Rigby, Charles Allen Robinson, Stanley Wilson Shields, Johan van Roojen, Jocelyn Langton Waller, and Eva Muriel White.

Part II., Radiology and Electrology.—William Wallace Boyce, Henry Warner Collins, George Eldridge Dyas, Thomas Garfield Evans, Max Hermann Knoch, William Christopher Long, Geoffrey Trevor Loughborough, Hector Bruce Mackenzie, Thomas Marlin, Harry Carew Nott, Claude Mallinson Rigby, Charles Allen Robinson, Stanley Wilson Shields, Johan van Roojen, Eva Muriel White, and Justina Augusta Wilson.

ROYAL COLLEGE OF PHYSICIANS OF LONDON.—An ordinary Comitia was held on July 29th, Sir Norman Moore, the President, in the chair. The minutes of the Censor's Board were read, and it was resolved—

"That Frederick Arthur Pring be declared to be no longer a Licentiate of the College, and that he forfeit all rights and privileges, and that his name be removed from the list during the pleasure of the College."

The President announced the following appointments:—Dr. F. Parkes Weber, to deliver the new Mitchell Lecture in 1921; Dr. George Graham, to be Goulstonian lecturer for 1921; Dr. Thomas Lewis, to be Oliver Sharpey lecturer for 1921; Dr. Arthur Whitfield, to be Lumleian lecturer for 1921; Dr. R. O. Moon, to be FitzPatrick lecturer for 1921; and Dr. Gordon M. Holmes, to be Croonian lecturer for 1922.—A grant of £100 was made to Sir F. W. Mott from the Croonian Trust for his researches.—Dr. Eardley Lancelot Holland was admitted to the Fellowship.—The following candidates, having passed the required examinations, were admitted as Members of the College:—Dr. A. C. Alport, Dr. F. V. Bevan-Brown, Dr. G. K. Bowes, Dr. H. C. H. Bull, Mr. W. S. Dawson, Dr. G. B. Dowling, Dr. H. Gardiner-Hill, Dr. T. J. H. Hoskin, Dr. J. Inkster, Dr. J. Joffe, Dr. J. W. McNee, Dr. T. H. Oliver, Dr. R. J. Perkins, Dr. J. H. Sheldon, Dr. G. J. Sophianopoulos, Dr. A. T. Stanton, Dr. H. Stott, Dr. R. J. C. Thompson, Dr. A. P. Thomson, Dr. A. G. Williams, Dr. T. P. Williams, Dr. Irene Yates.—Licences to practise physic were granted to 85 candidates who had conformed to the by-laws and regulations and passed the required examinations.—Diplomas in Public Health were granted jointly with the Royal College of Surgeons to 35 candidates.—The report of the examiners for the Murchison scholarship was received, and the scholarship was awarded to Roland John Perkins. John Vernon Cannadine Braithwaite, *proxime accessit*, was awarded a special scholarship of ten guineas.

The following College officers and examiners were elected on the recommendation of the President and Council:—Censors: Dr. Hector W. G. Mackenzie, Sir John Rose Bradford, Sir James Galloway, and Dr. John Fawcett. Sir Dyce Duckworth, Dr. J. A. Ormerod, and Dr. Arnold Chaplin were re-elected as Treasurer, Registrar, and Harveian Librarian respectively. Dr. Raymond H. P. Crawford was elected to the Library Committee, and Dr. G. F. Blacker to the Council, in place respectively of Dr. Mackenzie and Dr. Fawcett, elected censors.—The Fellows newly elected to office having given their faith to the College, the President announced that he had awarded the Bisset Hawkins medal to Dr. W. H. Hamer, and that he had nominated Sir William Hale White to serve on a committee appointed by the Minister of Health to advise upon the control of therapeutic substances, which cannot be tested by direct chemical means.—Dr. Dawson Williams was appointed to represent the College on the governing body of Birmingham University in the place of the late Dr. Samuel West.

A report was received from Sir Humphry Rolleston and Mr. H. J. Waring, representatives of the Royal Colleges, upon their visit to the examination held at Philadelphia, May 19th–26th, 1920, by the National Board of Examiners. This was referred to the Committee of Management after the President had spoken in highly appreciative terms of it.—A complete account of the proceedings of the Committee of Reference was received from the chairman, Dr. Sidney Martin. The thanks of the College were accorded to Dr. Martin and to Mr. F. G. Hallett, who acted as secretary to the Committee.—A report, dated June 9th, 1920, was received from the Representative of the College on the General Medical Council upon the proceedings of the Council at the meeting held in May–June last.—The annual report of the Cancer Research Fund was received and the thanks of the College were accorded to the Executive Committee.—A report from Sir George Savage concerning the Chelsea Physic Garden was received and entered on the minutes. Sir George Savage was reappointed a representative on the Committee of Management of the Chelsea Physic Garden.

ROYAL COLLEGE OF SURGEONS OF ENGLAND.—An ordinary Council meeting was held on July 29th, Sir Anthony Bowlby, President, in the chair.—Sir D'Arcy Power was readmitted to the Council.—A Report from the Court of Examiners for the diploma of Member was read, and diplomas of Membership were granted to 84 candidates mentioned in the report.—The Council elected Mr. Evelyn Sprawson, *M.C.*, M.R.C.S., L.D.S., a member of the Board of Examiners in Dental Surgery.

Primary Examination for the Fellowship.—The Council recommended that in future one paper of four questions be set in anatomy, and in physiology one paper of six questions, four of which must be answered. (This was in pursuance of a recommendation from the Board of Examiners. At the present time two papers in anatomy and two papers in physiology are set, each containing four questions, of which the candidate must answer only two. This plan was introduced in 1913 in consequence of recommendations from the examiners and teachers of that time. Formerly there was one paper in each subject, each containing four questions, of which not more than three had to be answered.)

A letter from the dean of the Royal Dental Hospital of London School of Dental Surgery was read, reporting the following resolution adopted by the Medical Committee of the school:—

That the Medical Committee of the Royal Dental Hospital has recently considered in detail the education of the dental student, and is of the opinion that it would be a great advantage if students could be allowed to present themselves for examination in anatomy, physiology, and dental anatomy at the end of the first year of study at a general hospital.

The matter was referred to the Dental Board of Examiners to consider.

A report of the Committee of Management was read, approved, and adopted, recommending that—

(*a*) The following be added to the list of institutions recognised for the instruction in chemistry and physics—viz., the College, Bishop's Stortford; Victoria Institute, Worcester.

(*b*) The following be added to the list of institutions whose graduates in Medicine are admissible to the Final Examination of the Examining Board in England under the conditions of Par. IV., Section III. of the regulations—viz., the University of Virginia, Charlottesville, U.S.A.

(*c*) Sir Charles Ballance, K.C.M.G., C.B., M.V.O., be appointed visitor to the examinations of the Egyptian School of Medicine for the next period of examination.

A letter was read from Sir John Rose Bradford reporting the transfer of certain stocks into the name of "The Royal College of Surgeons of England" in pursuance of the undertaking of the College to become the trustees and administrators of the Lister Memorial Fund. The provisions of the trust, as we have already noted (THE LANCET, July 24th, p. 223), are: (1) That out of the general fund a sum of £500, together with a bronze medal, be awarded every three years, irrespective of nationality, in recognition of distinguished contributions to surgical science, the recipient being required to give an address in London under the auspices of the Royal College of Surgeons. (2) That the award be made by a committee constituted as follows: Two members nominated by the Royal Society; two members nominated by the Royal College of Surgeons of England; one member nominated by the Royal College of Surgeons in Ireland; one member nominated by the University of Edinburgh; one member nominated by the University of Glasgow. (3) That any surplus income of the general fund, after providing for the erection of a monument, and after defraying administering expenses, be either devoted to the furtherance of surgical science by means of grants or be invested to increase the capital of the fund.

ROYAL COLLEGES OF PHYSICIANS OF LONDON AND SURGEONS OF ENGLAND.—At a meeting of Comitia of the Royal College of Physicians and of the Council of the Royal College of Surgeons on July 29th diplomas of L.R.C.P. and M.R.C.S. were respectively conferred upon 85 candidates who have passed the Final Examination in Medicine, Surgery, and Midwifery of the Conjoint Board, and have complied with the by-laws of the Colleges. The following are the names and medical schools of the successful candidates:—

A. N. Aitken, Rush Medical Coll.; H. S. Baker, St. Bart.'s; W. J. Birchall, Liverpool Univ.; S. Blackman, London; T. L. Bonar, Cambridge and St. George's; J. P. Brown and G. N. Campey, Liverpool; L. E. R. Carroll and G. W. Cheater, Charing Cross; H. S. Cohen, London; Sarah Annie Cooper, Charing Cross; D. Crawford, Cambridge and St. Bart.'s; J. W. Crawshaw, Manchester; F. W. Crook, Guy's; K. V. Deakin, Manchester; S. N. Deboo, Bombay; G. L. J. A. de Rynck, Univ. Coll.; W. D. Doherty, Guy's; T. A. J. Duff, Toronto; R. S. Fawssett, St. Bart's; J. Flanagan, Liverpool; Ada Marion Freeman, King's Coll.; Blanche Sutton Gardner, Royal Free; A. D. Gill, Birmingham; C. I. C. Gill, Cambridge and

Guy's; Doris Elsie Florence Goodall, Birmingham; E. E. D. Gray, Guy's; Hilda Treloggen Haggett, Royal Free; Gertrude Eleanor Harre, St. Mary's; H. A. Harris, Univ. Coll.; F. Heber, London; L. W. Hefferman, Middlesex; Sylvia Kema Hickson, Manchester; G. F. W. Howorth, Middlesex; H. V. Jackson, Bristol; F. J. Jauch, Middlesex; Marjorie Mary Jefferson, Manchester; Doris Eleanor Parker Jolly, King's Coll.; Silas G. Jones, Liverpool; Dorothy Maud Kemp, Royal Free; A. W. Kirkham, Manchester; J. N. Laing, St. Bart.'s; P. T. Liang, Cambridge and St. Thomas's; H. A. Lomax, Manchester; Mary Alice McHugh, Liverpool; G. J. W. McMichael, Univ. Coll.; R. T. McRae, London; Dora Mason, Royal Free and St. Mary's; W. F. Matthews, King's Coll.; L. B. Maxwell, St. Thomas's; Eva Morton, Royal Free; L. Moss, Guy's; Annie Agnes Muir, Liverpool; B. P. Nanavati, Bombay and London; C. W. Narbeth and D. G. F. Moore, St. Bart.'s; D. J. P. O'Meara, Guy's; R. Y. Paton, Cambridge and St. Mary's; P. H. Perera, Ceylon and London; J. Posner, Dublin; G. H. Potter, Liverpool; M. R. Rana, Bombay and Middlesex; G. K. Reeves, Guy's; M. H. Renall, St. Bart.'s; E. L. Robert and L. C. Rogers, Middlesex; W. R. Sadler, St. Bart.'s; J. A. P. Shaw, Cambridge and St. Thomas's; G. Sheehan, Manchester; F. D. Spencer, Birmingham; A. D. Stoute, Boston and Westminster; P. W. Symons, Middlesex; H. Tomlinson, Manchester; B. M. Tonkin, Guy's; M. Tree, London; Edith Helen Trimmer, St. George's; N. S. B. Vinter, St. Bart.'s; R. P. Wanless, Durham and Oxford; Helena Jane Webster, Westminster; C. H. Whittle, Cambridge and King's Coll.; Dorothea Compston Wigfield, Royal Free; W. R. Williams, Liverpool; and S. Wright and C. R. Young, Middlesex.

DIPLOMA IN PUBLIC HEALTH.

The Diploma in Public Health has been granted to the following 35 successful candidates:—

Lewis Anderson, King's Coll.; Kaikhushroo Maneckji Bharucha, Bombay and Univ. Coll.; Gordon Thomas Calthrop, Cambridge and Univ. Coll.; Arthur Skelding Cane, Cambridge and St. Bart.'s; Thomas Philips Cole, Guy's and King's Coll.; Delphine Gertrude D'Abreu, Univ. Coll.; Cuthbert Esquire Dukes, Edinburgh and Univ. Coll.; Reginald Oliver Eades and Hugh Alderson Fawcett, Univ. Coll.; Hubert John Burgess Fry, Oxford and Univ. Coll.; Andrew Radburne Fuller, St. Mary's and Univ. Coll.; Arthur Henry Habgood, Cambridge and London; Ronald Nelson Hunter, London and Middlesex; John Herbert Jordan, Cambridge and Middlesex; John du Plessis Langrishe, Dublin; Edward Richardson Lovell, Middlesex; Herbert Cubitt Lucey, Guy's; James Macalister Mackintosh, Glasgow and King's Coll.; Charles Arthur Mason, Edinburgh and Univ. Coll.; Edgar William Matthews, King's Coll.; William John Moir, Aberdeen and Univ. Coll.; Framroz Nanabhoy Moos and Dennis Salmon Page, Univ. Coll.; Wyndham Parker, Edinburgh and Univ. Coll.; Parmanand, Punjab and Univ. Coll.; Arthur Borland Porteous, St. Mary's; William Bentley Purchase, Cambridge, London, and Univ. Coll.; Maitland Radford, Univ. Coll.; Rowan William Revell, Middlesex; Frederick Emilius Roberts, St. George's; Arthur Burch Rosher, Charing Cross; Hugh Stott, Guy's; Wilfrid Reginald Taylor, St. Mary's; John Newton Webb, Adelaide and Univ. Coll.; and Augustus Joseph Wernet, Royal Naval College, Greenwich.

ROYAL COLLEGE OF PHYSICIANS OF EDINBURGH, ROYAL COLLEGE OF SURGEONS OF EDINBURGH, AND ROYAL FACULTY OF PHYSICIANS AND SURGEONS OF GLASGOW.—The following candidates have passed the Triple Qualification Examination:—

THIRD EXAMINATION.

Edward James Allan, Jemina Marianna M'Kechnie Calder, James M'Nie Campbell, Dominic Ciantar, William Arthur M'Kie Gibson, William Gray, Gerrit Johannes Lamprecht, Ian Fleming M'Ash, Saros Ardishair Dadabhai Naoroji, James Readdie, Sidney Sack, Joseph Alfred Henry Sykes, Enid Anne Williams, and Lilian Mary Williams.

FINAL EXAMINATION.

George Green, James Stewart Durward, Muriel Keyes, William Ewart de Silva, William Barton, Benjamin Bellilovsky, Frederic James Stevenson, Jesse Hayna Crawford, Agnes Macilwraith Hill, Karthegesa Ponniah, Andrew Gold, Arthur Henry Jacobs, Frank Arthur Smorfitt, Jessie Melville Lyell Wright, Percival Charles Holden Homer, Sidney Scott Sumner, William M'Mullan, Israel Goldberg, Oswald Brunlees, Douglas Chiene Scotland, Thomas Poole, James M'Glashan, John Stevenson, May Constance Boughton-Leigh, Thomas Hardie, and Thomas Arnoldus du Toit.

UNIVERSITY OF BRISTOL.—**The Markham Skerritt** prize, awarded every three years to that medical member of the University of Bristol who in the opinion of the board of the Faculty of Medicine has in the previous three years published the best original work in any branch of medical science, has recently been awarded to Professor F. H. Edgeworth and Mr. E. W. Hey Groves. During the war no award was made.

THE first post-graduate course held under the joint auspices of the Council of the College of Medicine, the honorary medical and surgical staff of the Royal Victoria Infirmary, Newcastle-on-Tyne, and the British Medical Association (North of England) has just been completed. The course was well attended and has been in every way a complete success. This success and the wish expressed by a large number of practitioners has encouraged the committee to continue the courses during the coming winter. The syllabus, which is under consideration at present, will be a revised and extended one, and a further announcement will appear in due course.

LONDON HOSPITALS: DISTRIBUTION OF SURPLUS RED CROSS FUNDS.—The Joint Finance Committee of the British Red Cross Society and the Order of St. John of Jerusalem, having invited the King's Fund to undertake the distribution of £250,000 out of the surplus funds at the disposal of the Committee amongst London hospitals, this has now been done upon conditions similar to those on which the Joint Committee had already made a distribution of surplus funds amongst hospitals outside London.

Certain conditions were to be attached to this distribution, e.g.:—

(*a*) That the distribution should be confined to hospitals in the London area that could and would treat ex-sailors or ex-soldiers.

(*b*) That it should take the form of capital grants in aid of definite schemes of extension or improvement that would directly or indirectly increase the facilities for the treatment of ex-Service men, no part of it being available for maintenance or for the payment of debts.

(*c*) That before any grant was actually paid over the scheme must be mature.

These conditions exclude from the special distribution certain hospitals, such as those providing for women and children only, eligible for the Fund's ordinary distribution, and include others ineligible under the ordinary rules. Applications were considered from 64 hospitals in respect of 81 schemes, and grants were recommended to 49 of these in respect of 54 schemes. The amount and purpose of the particular grants are as follows:—

Acton Hospital, £2500, extension, new out-patient department.

Beckenham Cottage Hospital, £2250, extension, new operating theatre.

Charing Cross Hospital, £1250, improvements to X ray department, nurses' home.

City of London Hospital for Diseases of the Chest, Victoria Park, £4000, surgical block and sanitary and other improvements.

Croydon General Hospital, £1000, additional nurses' accommodation (subject to the provision of fire exit).

Dreadnought Hospital, £7000, erection of sanatorium for tuberculous seamen at Bramshot, Hants.

East Ham Hospital, £9000, rebuilding as general hospital.

Finchley Cottage Hospital, £1750, extension, new administration block.

French Hospital, £2000, enlarged nurses' and servants' quarters, enlarged out-patient department, additional beds, and other improvements; in the order stated.

Great Northern Central Hospital, £15,500, new nurses' home, new boilers, and new kitchen; in the order stated.

Guy's Hospital, £11,000, nurses' home extension and special out-patient departments.

Hampstead General Hospital, £1000, electrical and physical departments, and other improvements.

Hendon Cottage Hospital, £600, new operating theatre, X ray room, and improved nurses' accommodation.

Hornsey Cottage Hospital, £1500, extension, new operating theatre.

Hospital for Consumption, Brompton, £7000, extension of sanatorium at Frimley.

Hospital for Diseases of the Throat, £2500, rebuilding of amalgamated hospital.

Hospital for Epilepsy and Paralysis, £2000, extension of out-patient department.

King's College Hospital, £1000, equipment of wards, theatres, and special departments.

London Homœopathic Hospital, £1250, improvements to boilers, lighting, lifts, heating.

London Hospital, £3500, new massage and electrical departments.

London Jewish Hospital, £1250, extension of in-patient department, kitchen, operating theatre.

London Temperance Hospital, £6000, new nurses' accommodation, improvements to isolation ward; provided that the Hospital Committee are satisfied that the ward already vacant and the ward vacated by the scheme can both be opened to patients.

Middlesex Hospital, £2700, new night nurses' home.

Middlesex Hospital Cancer Charity, £300, new night nurses' home.

Mildmay Mission Hospital, £2500, fire escape staircase, enlarged nurses' home, new operating theatre, and other improvements; on condition that the staircase is put in hand immediately.

Miller General Hospital for South-East London, £15,000, extension, new nurses' home, kitchen, and out-patient, casualty, and pathological departments.

National Hospital for Diseases of the Heart, £2000, extension of out-patient department.

National Hospital for the Paralysed and Epileptic, £1000, provision of out-patient operating room, and improvements to in-patient theatre.

Nelson Hospital for South Wimbledon, £2500, extension, additional nurses' rooms.

Norwood Cottage Hospital, £300, additional rooms and new X ray apparatus.

Passmore Edwards Hospital for Willesden, £8000, extension as general hospital.

Poplar Hospital, £6000, improved casualty department.

Prince of Wales's General Hospital, £10,000, extension, additional nurses' rooms.

Queen Mary's Hospital for the East End, £12,000, new nurses' home and in-patient operating theatre, subject to the submission of block plan for ultimate utilisation of complete site.

Royal Free Hospital, £8500, nurses' home and extension, in the order stated.

Royal National Orthopædic Hospital, £24,000, extension of out-patient department, X ray, electrical, exercise and Swedish drill rooms, nurses' bedrooms.

St. Bartholomew's Hospital, £24,000, new nurses' home.

St. John's Hospital, Lewisham, £1250, new out-patient department.

St. John's Hospital for Diseases of the Skin, £400, new nurses' accommodation.

St. Mark's Hospital, £600, new nurses' rooms.
St. Paul's Hospital for Skin, &c., £1500, new hospital in Endell-street.
St. Peter's Hospital for Stone, £600, new nurses' rooms, X ray rooms.
St. Thomas's Hospital, £2500, enlargement of nurses' dining room.
University College Hospital, £500, re-equipment of radiographic and electrical department.
West End Hospital for Nervous Diseases, £2500, removal to Regent's Park, improved nurses' accommodation at Regent's Park, and reconstruction of out-patient department at Welbeck-street. Of the grant of £2500, £500 is subject to the carrying out of the scheme for the provision of a new nurses' home at Regent's Park.
Western Ophthalmic Hospital, £2000, reconstruction and extension.
West London Hospital, £8000, new out-patient department.
Wimbledon Hospital, £1500, new nurses' home, and resident medical officer's quarters.
Woolwich War Memorial Hospital, £25,000, building of general hospital.

In making their allotment the Distribution Committee of the King's Fund has particularly borne in mind the importance of not unduly encouraging the provision of additional beds, and it was ultimately decided that much the larger proportion of the gift should be devoted to improvements involving only comparatively small additional expenditure on maintenance. The amount devoted to schemes other than bed extensions has been used to assist numerous improvements, which are no less important from the point of view of the treatment of ex-Service men, and often of greater urgency. They include the enlargement of out-patient accommodation, the improvement or equipment of massage, electrical, and X ray departments, new operating theatres, and the provision of better accommodation for nurses. The Distribution Committee had no hesitation in regarding nurses' homes as improvements within the scope of the special distribution.

The distribution is the subject of comment in a leading article in our present issue.

A POST-GRADUATE WEEK AT OXFORD.—A post-graduate course is to be held in the Radcliffe Infirmary and County Hospital at Oxford, conducted by members of the staff, from Friday, Oct. 1st, until Saturday, 9th. Those attending the course will be asked to contribute a nominal subscription of 10s. towards the incidental expenses. A social dinner will form part of the arrangements. Further particulars from Dr. H. A. B. Whitelocke, Radcliffe Infirmary, Oxford.

THE National Council for Combating Venereal Diseases has a vacancy for a medical man on the Commission which it is proposed to send to the East Indies and China in the autumn. Fuller particulars will be found in our advertising columns.

THE Department of Scientific and Industrial Research has now established four Subcommittees to assist the Radio-Research Board in the investigation of certain problems in connexion with the work of the Board. The Board and its Subcommittees are strongly constituted, the latter dealing with the propagation of wireless waves, atmospherics, directional wireless, and thermionic valves.

KING'S COLLEGE HOSPITAL MEDICAL SCHOOL (UNIVERSITY OF LONDON).—Dr. A. C. D. Firth has been appointed Tutor to Cambridge Students, Dr. Raymond Crawfurd Tutor to Oxford Students, and Dr. J. A. Drake Demonstrator in Dermatology and Sub-Dean of the Medical School. A "Burney Yeo" Entrance Scholarship of £80 has been awarded to Mr. F. W. Furniss, B.A., of Downing College, Cambridge.

EASTERN COUNTIES CENTRE FOR ARTIFICIAL LIMBS.—The Ministry of Pensions has established a branch centre for the fitting of artificial limbs for ex-soldiers and sailors living in the Eastern Counties. A large house called Fernhill, standing in its own grounds in a suburb of Norwich, has been utilised. It had been used during the war as a military hospital, and is well adapted for its present purpose. Beds are available for 30 pensioners, and the ex-soldier or ex-sailor who requires an artificial leg stays for 14 to 16 days while his new limb is being made and fitted. There is a resident surgeon who superintends the fitting from a surgical point of view. A member of the firm of Messrs. Charles Salmon and Sons, of London, who has been carrying out the same work in France, is in charge of the whole process of making and fitting in a series of workshops equipped for the purpose. The "trees" of the legs are made of willow, obtained near Thetford. The Norfolk willow is specially suitable on account of its lightness and close grain. The rough trunks are cut into suitable lengths, a large hole being bored through the centre of each, and are then left in a dry shed to season. Though there is a standard pattern, each artificial leg is made to match the remaining sound leg, casts being taken for the purpose. Most of the men have already had artificial legs made in France, and are now in need of new ones. Since the opening of the depôt two months ago about 120 men have been supplied. Artificial arms are not at present made in the depôt.

THE LATE DR. E. J. TULK-HART.—Eugene John Tulk-Hart, M.D. Durh., M.R.C.S., L.S.A., who died rather suddenly on July 28th, at the age of 73 years, was one of the oldest medical practitioners in Brighton, where his kindly disposition and sympathetic interest had secured for him a large circle of friends. He retired from practice some years ago in favour of his son.

THE PORTRAIT OF SIR MICHAEL FOSTER.—The portrait of Michael Foster, recently presented by his son, Dr. Michael Foster, to the National Portrait Gallery, was painted by the Hon. John Collier in the autumn of 1906, and is a striking presentment of the great physiologist. Michael Foster sat for the portrait at the request of the artist, who afterwards gave him the picture in token of the long and unbroken friendship existing between Foster and Huxley, Collier's father-in-law. The portrait was exhibited at the Royal Academy in 1907, the last sitting by the distinguished subject having taken place only a week before his death. A replica of the head was given by request by Mr. Collier to the Royal Society, in whose rooms it now hangs in memory of an extended and distinguished secretaryship. At Lady Foster's death the original portrait passed into the possession of Dr. Michael Foster, with the request that it should be presented to the National Portrait Gallery, a request that was carried out by Dr. Foster immediately on his return from active service in France in 1919. Not only Michael Foster's many friends, and large body of distinguished and attached students, but all the medical profession will recognise that the public acknowledgment of his great worth, thus obtained, has been well deserved.

THE CHARTERED SOCIETY OF MASSAGE AND MEDICAL GYMNASTICS.—This amalgamation of the Incorporated Society of Trained Masseuses and the Institute of Massage and Medical Gymnastics has been formed under Royal Charter for the purpose of affording protection to the profession of massage and to its registered members. It has the following programme:—To improve the training and status of masseuses and masseurs; to provide and supervise independent examinations; to set up registers of persons qualified to practise; to arrange post-graduate courses, lectures, and conferences; to supply work for members under registry regulations; and to work in all ways for the advancement and general welfare of the profession. Registration with the Chartered Society is open to all certificate holders of the Incorporated Society and of the Institute. Test examinations will be set up for the benefit of masseuses and masseurs of experience, holding certificates other than the above-mentioned, who wish to register with the Chartered Society. Forms of application for registration and all information can be obtained from the offices of the society, 157, Great Portland-street, W.1. The Chairman of Council of the Chartered Society is Sir E. Cooper Perry, and the Queen has consented to become Patroness.

THE LATE DR. J. NEEDHAM.—Joseph Needham, whose strenuous work in army hospitals during the war impaired his health, died on August 2nd, aged 67. Educated at the London Hospital and at Aberdeen, he won a London Hospital medical scholarship in 1875, in which year he qualified with the M.R.C.S. Eng. Four years later he graduated at Aberdeen University M.B., C.M., taking the highest honours and special honours for a graduation thesis, and in the next year, 1880, became a Member of the Royal College of Physicians of Edinburgh. After holding house appointments at the London Hospital and becoming assistant to the professor of anatomy in the University of Aberdeen, he was appointed demonstrator of histology at the London Hospital Medical College and at the London School of Medicine for Women. He was anæsthetist to the 3rd London General Hospital and to the Kensington Red Cross (Weir) Hospital, medical officer to the Education Department of the London County Council, and surgeon to the Metropolitan Police.

CENTRAL MIDWIVES BOARD.—A special meeting of the Central Midwives Board was held at Queen Anne's Gate Buildings, Westminster, on July 22nd, with Professor H. Briggs in the chair, the chairman of the Board, Sir Francis Champneys, Bart., being absent through illness. This is the first occasion since the Board was first constituted on which the chairman has been absent. Two midwives were struck off the roll; one was cautioned and in other cases sentence was postponed, the following charges, amongst others, having been brought forward:—

That being in attendance at a confinement and the child suffering from inflammation of or discharge from the eyes, and continuing so to suffer, the midwife did not explain that the case was one in which the attendance of a registered medical practitioner was required, as provided by Rule E.21 (5), and she discontinued her attendance at a time when the child was so suffering as aforesaid. Medical aid having been sought for a patient the midwife neglected to notify the local supervising authority thereof, as required by Rule E.22 (1) (a), and she did not keep her register of cases, as

required by Rule E. 24. A child suffering from convulsions and dangerous feebleness and the midwife having explained that the case was one in which the attendance of a registered medical practitioner was required, she neglected to hand to the husband or the nearest relative or friend present the form of sending for medical help, properly filled up and signed by her, in order that this might immediately be forwarded to a medical practitioner or to an approved institution, as required by Rule E. 20 and 21 (5). A child having died before the attendance of a registered medical practitioner, the midwife neglected to notify the local supervising authority thereof, as required by Rule E. 22 (1) (b), and she did not at each visit record the pulse and temperature of the patient in a notebook or on a chart carefully preserved, as required by Rule E. 14. A presentation being other than the uncomplicated head or breech, the midwife did not explain that the case was one in which the attendance of a registered medical practitioner was required, as provided by Rule E. 21 (3); she did not stay with the patient after the commencement of the second stage of labour until the expulsion of the placenta and membranes, as required by Rule E. 7, and she neglected to pay to the patient a sufficient number of visits to satisfy the requirements of Rule E. 12. A case being one of puerperal fever or other condition supposed to be infectious, the midwife neglected to notify the local supervising authority that she was herself liable to be a source of infection, as required by Rule E. 6, E. 22 (1) (e), and E. 23, Form (e). Being suspended from practice by the local supervising authority for the purpose of preventing the spread of infection under Rule F. a midwife during the period of suspension paid visits to the maternity patients upon whom she had been in attendance at the date of such suspension.

THE LATE DR. F. J. H. BATEMAN.—Francis John Harvey Bateman, who died from heart failure while about to leave his residence for a holiday at Torquay, was 51 years of age, and was the son of the late Sir Frederick Bateman, M.D. Educated at Norwich Grammar School and at Pembroke College, Cambridge, he subsequently studied medicine at Edinburgh and Paris. After graduating M.B., C.M. at Edinburgh in 1898 he held resident posts at the Royal Infirmary in that city and at the Leith Hospital. He graduated also B.A. and M.A. at Cambridge in 1890 and 1901 respectively, proceeding to the M.D. Edinburgh in 1905. For a time he acted as assistant medical officer to the West Riding Asylum, Wakefield, and later went to Paris as resident medical officer to the Hertford British Hospital, and worked while there at the Pasteur Institute and at the French hospitals. Dr. Bateman was a vice-president of the Medical Society of London, a Fellow of the Obstetrical Society, a member d'Alliance Franco-Britannique, and a J.P. for the County of London. Among his appointments were those of medical officer to the Blackheath and Charlton Hospital, the Belmont Home for Ladies, the Dartmouth Home for Crippled Boys, Blackheath, and the St. Dunstan's Annexe for Blind Soldiers, Blackheath, while he was also medical adviser to the Blackheath High School.

ROYAL MEDICAL BENEVOLENT FUND.—At the last meeting of the committee, held on July 13th, 19 cases were considered, and £202 5*s*. voted to the applicants. The following is a summary of some of the cases relieved:—

Daughter, aged 60, of M.R.C.S. Eng. who practised at Marske-by-the-Sea and died in 1869. Applicant's only income is £28 a year from investments. She acts as general help in a home in return for food and fire. She suffers from chronic ill-health, and has had several operations. Her invalid sister lives with her, and she is quite incapable. Voted £10 in two instalments.—Widow, aged 64, of M.D. Mast Surgeon who practised in Jamaica and died in 1889. Applicant's only income is £54 16*s*. from another charity. She lives alone, and friends pay the rent. Cannot manage at present owing to the high cost of living. Voted £5.—Daughter, aged 50, of M.D. Dub. who practised at Douglas, Isle of Man, and died in 1882. Suffers from ill-health and is unable to work. She receives £50 from friends and £7 10*s*. from investments. Shares home with a friend, and pays part rent. Asks for further help, owing to the high cost of living. Relieved five times, £22. Voted £5.—Daughter, aged 70, of M.R.C.S. Eng. who practised at Buxton and died in 1878. Applicant is a trained nurse, but cannot earn much now on account of her advanced age. She has no other income but what she earns, and lives with her sister, who has to keep her. Relieved twice, £30. Voted £18 in 12 instalments.—Widow, aged 71, of M.D. Glasg. who practised at Dennistoun and died in 1876. Her only income is £20 from another charity. She lives with her married daughter, who can scarcely afford to keep her. She is crippled with rheumatism. Relieved six times, £78. Voted £18 in 12 instalments.—Widow, aged 59, of F.R.C.S. Edin. who practised in London and died in February, 1919. Applicant's husband had received help from the Fund. On the death of her husband she took a post as temporary clerk at £2 a week, but has now had to give this up, and asks for help until she obtains another post. No other income. Rent 8*s*. a week. Relieved once, £5. Voted £5.

Subscriptions may be sent to the honorary treasurer, Sir Charters J. Symonds, at 11, Chandos-street, Cavendish-square, London, W. 1.

BOOKS, ETC., RECEIVED.

AMERICAN PEDRIATIC SOCIETY, 1805 Spruce-street, Philadelphia.
Transactions (June 16th, 17th, 18th, 1919). Edited by O. M. Schloss, M.D. Pp. 270.

ARNOLD, EDWARD, London.
Lectures on Surgery to Nurses. By A. H. Todd, B.Sc., M.S. Pp. 270. 7*s*. 6*d*.
Medical Gymnastics in Medicine and Surgery. By E. B. Clayton, M.B. Pp. 159 5*s*.

BAILLIÈRE, TINDALL, AND COX, London.
Diagnosis of Bacteria and Blood Parasites. By E. P. Minett, M.D. 3rd ed. Pp. 94. 7*s*. 6*d*.
Aids to Osteology. By P. Turner, B.Sc., M.S. 2nd ed. Pp. 187. 4*s*. 6*d*.
Nurses' Complete Medical Dictionary. 2nd ed. Edited by Constance M. Douthwaite. Pp. 206. 3*s*.
The Duties of Sisters in Small Hospitals. By Félicie Norton. Pp. 75. 4*s*. 6*d*.

FROWDE, HENRY, AND HODDER AND STOUGHTON.
Infectious Diseases: A Practical Text-book. By C. B. Ker, M.D. 2nd ed. Pp. 628. £2 2*s*.

LEHMANN, J. F., München.
Erkennung der Geistesstörungen (Psychiatrische Diagnostik). Von Prof. W. Weygandt. Pp. 250. M. 34.
Diagnostik innerer Krankheiten in Tabellenform. Von Dr. A. J. Cemach. M. 15.
Atlas und Grundriss der Bakteriologie und Lehrbuch der speziellen bakteriologischen Diagnostik. Teil I.: Atlas. 79 plates. Teil II.: Text. Pp. 847. Von Prof. Dr. K. B. Lehmann, Direktor des Hygienischen Institutes in Würzburg, und Prof. Dr. Med. et Phil. R. O. Neumann, Direktor des Hygienischen Institutes in Bonn. 6. Auflage. Durch einen Nachtrag ergänzter Neudruck der 5. Auflage. M. 60.

LONGMANS, GREEN, AND CO., London and India.
The Essentials of Histology. Descriptive and Practical for the Use of Students. By Prof. Sir Edward S. Schafer, F.R.S. 11th ed. Pp. 577. 14*s*.
Sanitary Law in Question and Answer for the Use of Students of Public Health. By C. Porter, M.D. 2nd ed. Pp. 180. 6*s*. 6*d*.

THIEME, G., Leipzig.
Anatomie des menschlichen Gehirns und Rückenmarks auf myelogenetischer Grundlage. Von Paul Flechsig. Pp. 68 and 24 plates.
Grundriss der Augenheilkunde. By Prof. A. Brückner and Prof. W. Meisner. Pp. 650
Grundriss de Physiologie (Biochemie). By C. Oppenheimer. Pp. 522.

Medical Diary.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

LONDON HOSPITAL MEDICAL COLLEGE.
MEDICAL UNIT, in the Clinical Theatre of the London Hospital, E.
A Course of Twelve Lectures on Neurology, open to Students and Graduates of the London Hospital and other Schools—
TUESDAY, August 10th.—2 P.M., Lecture IX.:—Dr. Riddoch: Disorders of Reflex Functions from Lesions of the Spinal Cord.
WEDNESDAY.—2 P.M., Lecture X.:—Dr. Thompson: Symptoms and Causes of Paraplegia.

WEST LONDON POST-GRADUATE COLLEGE, West London Hospital, Hammersmith, W.
MONDAY, August 9th.—12.15 P.M., Dr. Burnford: Pathological Demonstration. 4.30 P.M., Mr. D. Armour: Subphrenic Abscess.
TUESDAY.—12 noon, Mr. T. Gray: Demonstration of Fractures, &c. 4.30 P.M., Mr. Banks Davis: Clinical Lecture:—II., Throat and Ear.
WEDNESDAY.—11.30 A.M., Mr. MacDonald: Demonstration of Cystoscopy. 2.30 P.M., Mr. D. Armour: Demonstration of Surgical Cases.
THURSDAY.—10.30 A.M., Dr. Simson: Gynæcological Demonstration. 4.30 P.M., Mr. B. Harman: Employer's Liability in Eye Injuries.
FRIDAY.—12.15 P.M., Dr. Burnford: Applied Pathology. 4.30 P.M., Mr. D. Buxton: Common Diseases and Injuries affecting the Buccal Cavity, their Recognition and Treatment.
SATURDAY.—12 noon, Mr. N. Sinclair: Surgical Diseases of the Abdomen.
Daily:—10 A.M., Ward Visits. 2 P.M., In-patient, Out-patient Clinics and Operations.

MALE LOCK HOSPITAL, Dean-street, W.
MONDAY, August 9th, WEDNESDAY, AND FRIDAY.—5 P.M., Dr. C. Russ: Demonstration of the Treatment of Gonorrhœa by Electrolysis.

CANCER HOSPITAL, Fulham-road, S.W.
Clinical Lectures on the Diagnosis and Treatment of Cancer.
TUESDAY, August 10th.—4.30 P.M., Mr. R. H. J. Swan: Cancer in the Urinary Tract.
FRIDAY.—4.30 P.M., Dr. A. Leitch: How Cancer Spreads.

Appointments.

Successful applicants for vacancies, Secretaries of Public Institutions, and others possessing information suitable for this column, are invited to forward to THE LANCET *Office, directed to the Sub-Editor, not later than 9 o'clock on the Thursday morning of each week, such information for gratuitous publication.*

MCINTOSH, T. S., M.D. Edin., has been appointed Medical Officer of Health for Hendon.
SHATTOCK, C. E., M.D., M.S., F.R.C.S., Assistant Surgeon to the Royal Free Hospital.

SINCLAIR, N. F., F.R.C.S. Edin., Assistant Surgeon to the West London Hospital.
SMITH, E., M.D. Lond., Coroner for North-East District of London.

Certifying Surgeons under the Factory and Workshop Acts: GAYNOR, G. C., M.B., B.Ch. N.U.I. (Wymondham); ARMSTRONG, C. (Dulais Valley).

Vacancies.

For further information refer to the advertisement columns.

Ashton-under-Lyne Union.—Asst. Med. Supt. and M.O. £368 10*s.*
Barnsley, Beckett Hospital and Dispensary.—Sen. H.S. £250.
Battersea General Hospital (Incorporated), Battersea Park, S.W.—Third Res. M.O. £200.
Bengal, University of Dacca.—Chair of Physical Education. Rs. 9000 to Rs. 12,000.
Birmingham General Dispensary.—Res. M.O. £400.
Birmingham General Hospital.—Res. M.O. £155. Also Obst. H.S., H.S., and Cas. H.S. £100 each. Also Res. Anæsth. £100. Also H.S. £125.
Birmingham University.—Lect. in Physiology. £250. Demonstrator in Pathology. £350.
Blackpool, Victoria Hospital.—H.S. £300–£350.
Bournemouth, Royal Victoria and West Hants Hospital.—Res. M.O. £200.
Bristol Eye Hospital.—H.S. £150.
Cancer Hospital, Fulham-road.—Asst. P. and Med. Reg. £250.
Chester Royal Infirmary.—H.P. £150.
Colonial Service.—M.O.'s for West African Medical Staff, Government Service in Malaya, East African Protectorates, West Indies (including British Guiana), Fiji, and the Western Pacific, &c.
Coventry Education Committee.—Two Sch. Dentists. £500.
Derby Borough Mental Hospital.—Asst. M.O. £350.
Derby County Borough Education Committee.—Asst. Sch. M.O. £500.
Dreadnought Hospital, Greenwich.—H.S. and H.P. £100.
Fulham Metropolitan Borough.—M.O. for Infant Welfare Centres. £2 2*s.* per session.
Gartnavel, Glasgow Royal Asylum.—Asst. M.O. £300.
Hertford County Hospital.—H.S. £200.
Hospital for Consumption and Diseases of the Chest, Brompton.—H.P.
Hove, Carr-Burton Memorial Hospital, Sackville-road.—Res. M.O. £250.
Isle of Ely County Council.—Clin. Tuberc. O. and Asst. M.O.H and Sch. M.O. £600.
Keighley Borough Education Committee.—Female Asst. M.O. £500.
King's Lynn, West Norfolk and King's Lynn Hospital.—Res. M.O. £150.
Leasowe Hospital for Children, Cheshire.—Jun. M.O. £200.
Leavesden Mental Hospital, King's Langley, Herts.—Jun. Asst. M.O. £515.
Leicestershire and Rutland Mental Hospital, Narborough, near Leicester.—Jun. Asst. M.O. £300.
Lincoln County Hospital.—Jun. H.S. £150.
Liverpool, David Lewis Northern Hospital.—Two H.P.'s and Three H.S.'s. £120.
Liverpool, Fazakerley Sanatorium.—Asst. Res. M.O. £300.
Liverpool, Royal Children's Hospital.—Hon. P. and Hon. Asst. S.
Liverpool, Royal Southern Hospital.—Two H.P.'s and Three H.S.'s. £100.
Liverpool School of Tropical Medicine.—Three Medical Men for Clinical and Research Work in Tropical Medicine.
London County Council Mental Hospital Service.—Asst. M.O.'s.
London Temperance Hospital, Hampstead-road, N.W.—Cas. O. £200. Also Radiographer. £105.
Maidstone, Kent County Mental Hospital.—Jun. Asst. M.O. £300.
Maidstone, West Kent General Hospital.—H.S. £250.
Manchester, Ancoats Hospital.—H.S. £150.
Manchester, Barnes Convalescent Hospital, Cheadle.—Res. M.O. £300.
Manchester Children's Hospital, Pendlebury, near Manchester.—Two Res. M.O.'s. £150.
Manchester, Crossley Sanatorium, Delamere Forest, Cheshire.—Asst. M.O. £350.
Manchester, Hulme Dispensary, Dale-street.—H.S. £400.
Manchester Royal Infirmary.—Res. M.O. £250.
Mile-End Old Town, Hamlet of.—Second Asst. M.O. £300.
Miller General Hospital for South-East London.—H.S. £150.
National Council for Combating Venereal Diseases.—Medical Member of Commission to East Indies and China.
Newcastle-upon-Tyne Education Committee.—Dental S. £400.
Newcastle-upon-Tyne, University of Durham College of Medicine.—Lect. on Med. Jurisprudence. Sen. and Jun. Demonstrators of Anatomy. £450 and £350 respectively.
Preston Royal Infirmary.—Res. M.O. £180.
Queen Mary's Hospital, Stratford, E.—H.P.
Royal Free Hospital, Gray's Inn-road, W.C.—Obst. H.S. £50.
Salford Union Infirmary.—Res. Asst. M.O. £350.
Sheffield Royal Infirmary.—H.P. £150.
Southport General Infirmary.—Sen. H.S. and Jun. H.S. £250 and £175 respectively.
Stafford, Staffordshire General Infirmary.—H.S. £250.
Stockport General Infirmary.—Jun. Res. S. £200.
Sunderland Royal Infirmary (Children's Hospital).—Female Jun. Res. M.O. £150.
Surrey County Council.—Tuberc. M.O. £770.
Swansea General and Eye Hospital.—Jun. H.S. £200.
Swindon Borough.—M.O.H. and Med. Supt. of Isolation Hospital. £900.
Taunton and Somerset Hospital.—Sen. and Jun. H.S.'s. £200 and £150.
Tiverton Hospital, Devon.—H.S. £100.
University of London.—Prof. of Med. and Director of Med. Clin. £2000. Chair of Radiology. £1000.

Births, Marriages, and Deaths.

BIRTHS.

DE SMIDT.—On July 21st, at Blinco-grove, Cambridge, the wife of F. P. G. de Smidt, M.R.C.S., L.R.C.P., D.P.H., of a daughter.

MARRIAGES.

AITCHISON—FAIRBAIRN.—On July 27th, at New North United Free Church, Edinburgh, Captain R. Chalmers Aitchison, R.A.M.C., to Jessie Cunningham, daughter of the late Mr. and Mrs. David B. Fairbairn of Dunraven, Balerno, Midlothian.

DEATHS.

BATEMAN.—On August 2nd, suddenly, Francis John Harvey Bateman, J.P., M.A., M.D., of Heath End, Blackheath, aged 51.
EWART.—On August 1st, suddenly, at Eastney, Devonshire-place, Eastbourne, John Henry Ewart, M.R.C.S., L.R.C.P., aged 73.
MUNRO.—On July 18th, at Elmbank, Largs, Robert Munro, M.D., LL.D., in his 85th year.
NEEDHAM.—On August 2nd, at Clapham Park, Joseph Needham, M.B., C.M Aberd., of Harley-street and Clapham Park, S.W.
VICKERS.—On August 1st, at Roseneath, Paignton, Charles William Vickers, M.R.C.S., L.R.C.P., D.P.H., in his 73rd year.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

Communications, Letters, &c., to the Editor have been received from—

A.—Aberdeen, Medical Officer of Health of.
B.—Mr. J. Brittle, Derby; Dr. J. L. Brownlie, Manchester; Sir J. Barr, Liverpool; Capt. G. H. Barry, R.A.M.C., Alexandria; Col. R. J. Blackham, Bearsted; Dr. A. E. Boycott, Radlett.
C.—Cunard Steamship Co., Liverpool; Children's Country Holidays Fund, Lond.; Dr. C. Coombs, Bristol; Prof. A. R. Cushny, Edinburgh; Dr. P. J. Cammidge, Lond.
D.—Dr. J. S. Dunn, Swanage.
E.—Mr. J. Everidge, Lond.; Dr. A. Erdös, Oradea Mare.
F.—Dr. Z. P. Fernandez, Leeds.
G.—Mr. H. Gardner, Lond.; Dr. A. W. Green, Lond.; Mr. C. D'O. Grange, Harrogate.
H.—Dr. E. Holland, Lond.; Dr. E. Houdart, Bel-Air; Dr. A. F. Hurst, Lond.; Dr. N. Hodgson, Newcastle-on-Tyne.
J.—*Journal of the American Medical Association*, Chicago.
K.—Dr. C. B. Ker, Edinburgh; Prof. A. F. S. Kent, Manchester; Mr. G. Keynes, Lond.; King's College Hospital Medical School, Lond., Sec. of.
L.—London and Counties Medical Protection Society, General Sec. of; Miss G. M. E. Leigh, Birmingham; Dr. A. Loxton, Minehead.
M.—Dr. S. R. Macphail, Derby; Ministry of Health, Lond.; Dr. J. N. Matthews, Glossop; Dr. J. B. McDougall, Wakefield; Dr. T. H. Morse, Deal; Mount Vernon Hospital for Consumption, Lond.; Metropolitan Hospital Sunday Fund, Lond.; Metropolitan Asylums Board, Lond.; Medico-Psychological Association of Great Britain and Ireland, General Sec. of.
N.—National Baby Week Council, Lond.; Dr. F. M. Neild, Crowborough; National Hospital for the Paralysed and Epileptic, Lond.; National Society for the Prevention of Cruelty to Children, Lond.
P.—Dr. K. B. Pinson, Chorlton-on-Medlock.
R.—Dr. J. D. Rolleston, Lond.; Royal Mail Steam Packet Co., Lond.; Royal Faculty of Physicians and Surgeons, Glagow.
S.—Dr. C. Sauvineau, Paris; Dr. J. Sinclair, Lond.; Société des Sciences Médicales et Biologiques de Montpellier.
T.—Dr. F. H. Teale, Paikstone.
U.—*Unity*, Lond., Editor of.
W.—Dr. H. Whitby, Colchester; White Star Line, Southampton, Local Manager of; West London Hospital Post-Graduate College, Sec. of; Dr. H. M. Woodcock, Walton-on-Thames; Mr. R. O. Ward, Lond.
Y.—Dr. R. A. Young, Lond.

Communications relating to the editorial business should be addressed exclusively to the Editor of THE LANCET, 423, Strand, London, W.C. 2.

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His Majesty the King has been graciously pleased to become the Patron of The People's League of Health.

Notes, Short Comments, and Answers to Correspondents.

THE ART OF HEALING.[1]

BY PROFESSOR ARTHUR KEITH, M.D.

YOU have done me an honour by inviting me to come and speak to you, one which I should little deserve unless I can say something which will serve to quicken your interest in your daily work. Your business in life, as it is also mine, is to help in healing those who have been maimed by injury or disabled by the results of disease. If you were to say that I have no claim to be called a healer for the reason that I never see cases of sickness or attend upon them as physician or surgeon, I would reply that every man who teaches, and particularly any man who discovers, facts relating to the working of the human body is a healer, for we cannot hope to make a machine work rightly unless we know the nature and action of its parts. In this sense even an anatomist is a healer. In your case there can be no question; every day you have to apply treatment to men, women, or children for the relief of stiffness, paralysis, pain, or weakness, or one or other of the many disablements to which the human body is so liable. You are healers, there can be no question of that. But whether it be a case of sprained ankle to which you are called upon to apply your art, or one of broken wrist, or to a man suffering from sciatica, a woman from rheumatic changes in the joints, a child suffering from the late effects of pleurisy, or a middle-aged spinster in the dire throes of facial neuralgia, your interest in your cases, your final success in dealing with them, and the ultimate health of your patient will depend upon your knowledge not of your own particular art, but of how far you have grasped the principles which underlie the Art of Healing. You will understand, then, why I have chosen this as a subject on which to address you, but you will also observe that in giving your secretary a title for my address I was careful to say nothing about principles, because when a Scotchman threatens to speak about principles everybody finds they have urgent business elsewhere. But having got you here I am to take a mean advantage and thrust my principles on you—the principles or laws on which the Art of Healing is based.

Decayed Teeth do not Heal.

There are no parts of the body which can better help us to understand the true nature of the art of healing than those structures with which we have been familiar from infancy upwards—our teeth. That most prevalent of all diseases, caries of the teeth, we all have had experience of at first hand. One morning we are surprised to find—or, if we are in the happier position of being able to afford regular visits to a dentist, our dentist is surprised to find—a hole or ulcer eating into a tooth without our being aware of the fact, there having been not the slightest warning or pain. Pain comes when the pulp cavity is reached—pain and plenty of it; but that is too late for Nature to step in and give us a preventive warning. If a sore or ulcer had formed on the cheek we should have been instantly aware of our danger and have been able to take measures for treatment. We should also know that, in most cases of ulcer or sore, repair will set in and heal the breach. But a hole or ulcer in a tooth will not heal, try how we will; it has no power of repair. The best a dentist can do for us is to clear out the dead tissue, introduce a stopping, and thus avert the disease. The most skilled dentist in the world cannot heal a tooth, cannot make the wall of the cavity produce fresh dentine and new enamel and thus restore the breach; his failure is not his fault, but that of Nature, because she has not given our teeth, for a reason I will explain presently, that virtue or healing power which she has most bountifully bestowed on all the other structures and tissues of our bodies. You will see the point I am trying to score—viz., that if Nature had not endowed our bodies with the power to heal, neither the surgeon, physician, nor masseuse could have done anything whatsoever for the cure of injury or of disease. They could have done no more—perhaps not so much—than the dentist can do for our teeth. They could only have stitched tears of the skin or stopped holes in the flesh. Conceive our condition if such had been the case: the hundreds of men who had broken bones in the accidents of civil life would be walking the streets in splints for the rest of their lives; every one of us would be covered with stitched cuts—often in want of renewal—or with holes which constantly wanted re-stopping, or with ulcers ever weeping, or bruises unchangeably coloured as the rainbow. A modern city would be a warren of surgical out-patients, had Nature not endowed the rest of the body better than the teeth. Think of the condition of our soldiers at the end of a war if their bodies had forgotten how to heal! If we remember these things you will see that when we claim a cure we should not forget how much of our success we owe to the bounties of Dame Nature.

Healing Depends on Cells.

Why has Nature been so culpably negligent as to leave our teeth healingless? It is worth some trouble to look into this matter if only to learn how remarkably prudent she has been on our behalf in all her works. If our teeth had been provided with nerves as freely as our skin; then we should have had warning of the first onset of caries, and could have taken steps to remove the disease at its beginning. But then, what about cracking nuts and chewing roots and tough meat, as primitive man had to do? Eating would have been too painful a process to be indulged in. Nature did her best to secure attention to the teeth by awarding the most excruciating of pains to those who do neglect their teeth. Under the circumstances which conditioned her handiwork she could do no more. But lack of nerves does not explain why teeth have no power to heal, although I think that those parts of the body which are most liberally supplied with nerves of common sensation have a better power of healing than those which have a poor supply. The chief reason was that the substance of the teeth had to be made so hard and resistant that it was impossible to introduce into the enamel or dentine those soft living units which we speak of as cells. It is in these living cells that the power to heal lies; enamel cannot mend a breach in itself because it has got no cells; bone can, because everywhere it provides minute but comfortable nests or residences for the numerous living units scattered through its substance. If we would understand the art of healing, then we must know something of the living units in which the power to heal resides.

We must not think that every cell in the human body can play a part in the act of healing. A nerve cell, and it is also so with a cartilage cell, cannot even mend its own body, much less take a part in the healing of a breach or wound; if injured they die. The epithelial cells which cover the skin can, as you know, multiply, spread, and thus cover over any superficial breach of the body. The epithelium which lines the stomach, bowel, windpipe, and other canals and passages of the body have also this power. But the cells which have been furnished with the greatest degree of healing power are those of the white connective tissues—the tissues which bind the skin down to the underlying parts and which join together the various parts of the body. Let us suppose a muscle has been ruptured or torn, such as the biceps of the arm. Blood oozes into and fills the tear or breach in the muscle. Immediately messages go out, of kinds we do not yet know, and summon from the rest of the body millions of white blood corpuscles to the site of the injury—the workmen who have to clear away the débris caused by the accident. What interests us most, however, is the behaviour of the connective tissue cells lying in the walls of the breach. Up to the time of the accident they have been leading placid, passive lives, binding loosely together the fibres of the muscle without in any way interfering with their contractile duties. In ordinary circumstances they would have gone on performing this quiet duty all their days, just as their forefathers had done for endless generations before them. With the accident their disposition and mode of life change radically and suddenly. They take on, as it were, a fury of action, change their shape, begin to divide and breed, giving rise to broods of builders which are to mend the gap in the muscle. These builders are not poured out as an undisciplined mob; they proceed as orderly marshalled armies. As quickly as they grow out to fill the gap from the sides of the wound they are accompanied by sprouts from the neighbouring capillary vessels and are thus furnished with the means of sustenance. When the débris in the wound has been cleared away and the gap thus filled with a new army of connective tissue units, the units or soldiers begin to change from an active to a passive state; they shrink and form a cicatrix—a mere connective tissue cement. In this way Nature stitches the torn ends of the muscle together. We admit that the surgeon may expose the torn ends of the muscles, clear away the blood and damaged fragments, and stitch the torn ends together, but even when this is done Nature has still her operation to perform, for the only stitches which ultimately hold are those inserted by those extraordinary cobblers—the connective-tissue cells. What rouses these armies of menders to action we do not know. The power to heal is one of the marvels with which living tissues have been endowed. Unless it were so the surgeon would necessarily be a mere cobbler. All we do know is that these living units can do their work unaided by any

[1] Inaugural address at Summer Meeting of Incorporated Society of Trained Masseuses, June 29th, 1920.

human agency, but we also know we can hinder them as well as help them. Long ago Ambrose Paré put the matter in a nutshell when he said: "I dressed the wound; God healed it."

How to Aid the Cells Rightly.

The art of healing lies, then, not in knowing how we can heal the human body, but in knowing how we can help the living units of the body to perform this task for us. We have to study and know the habits and proclivities of these microscopic healing units of the body just as closely and well as we watch and note the ways and weaknesses of our best friends. We cannot watch those indispensable healing assistants too closely. John Hunter knew that. Every time he uncovered a wound and saw the red granulation tissue building up the gap in the flesh he studied it as a gardener does his most precious bud. He saw that the healing tissue must have quiet and comfort in which to do its work. Think for half a minute what progress you would make in mending a rent in your skirt if some restless terrier kept tugging at the hem. Your stitches would be ripped out almost as soon as you had tightened them. Think, then, of the uphill task that confronts the armies of cells which are trying to make good a tear or rupture in a muscle, if that muscle continues to be thrown into action. Nature has foreseen their difficulties and throws the muscle out of action. Hunter observed that if a muscle or tendon was ruptured the patient ceased to have the power to call it into action. At a later stage action and massage may become necessary, but of that we shall speak later on. It was long after Hunter's time that Pasteur and Lister discovered micro-organisms to be the chief enemies of the healing units. If such enemies can be excluded from the body the armies of healing tissue can proceed quietly about their work of mending; if they are not protected from these invaders they have to fight as well as build. It is like reaping a field of corn with most of the reapers serving as policemen. In this way surgeons greatly improved the art of healing by discovering simply why in some cases the real healers of the body were hindered in their work. Then other discoveries led on to further improvements in the art. It is a discovery of ancient times that the human body, after an attack of small-pox, was immune henceforth from this disease. Jenner found out that he could produce an immunity by vaccinating the body with the lymph of cow-pox. Then later we came to understand that the body of anyone attacked by a contagious or infectious disease was the scene of a widespread and terrific battle between invading hosts of micro-organisms and defensive mobile armies represented by the white corpuscles of the blood. At first the physician could do little more than look on and pray for the defenders to have the best of the fight, but by patient and continued observation he is learning how to strengthen the defenders by the use of vaccines, anti-toxins, and other methods of our modern serumtherapy. Here, again, the medical man is not really the healer; that power is inherent in the patient's blood and body; all he can do is to supply such conditions as are within his reach which will give victory to the defensive armies of the body. The best a physician can do is only to hold the lamp while Nature does the mending. But if he knows how to hold it rightly he may well make all the difference in the ultimate result, the difference between recovery and health.

We are but Nature's Assistants.

You will see that the conception I am thrusting home to you is that the power to heal or to regain health lies not in our hands or heads, but in the living flesh and blood of our patients' bodies. The most skilled of us—be we physicians, surgeons, obstetricians, or masseuses—are but Nature's assistants; she does the work, we only have to know how to wait upon her; to wait upon her judiciously is to practise the art of healing in its highest form. This, however, is not the opinion formed of us by the general public nor even by the educated public. Medical men, I fear, have occasionally conveyed the impression that they can heal or cure; one may hear the shallower man declare that he can cure this disease and that; that he saved this woman and rescued that child from death. As a matter of fact, he may have been an essential circumstance in the recovery, but if he is a wise man he claims no more; unless Nature had played her part he would have done his in vain. The impression has laid hold of the public that we can cure, and hence we are tempted to play the part assigned to us. The quack has seized upon this delusion of the public and fools it to the height of its bent by promising in the most unqualified terms to give an assured cure in exchange for a definite payment. They promise cures for cancer! Now that is one of the diseases which even Nature cannot remedy or cure, except on rare occasions. We do not know why she succeeds in these rare cases. Hence, ultimately, even cancer-curers have to own up that their nostrums are useless, because Nature does not support them. But in the great majority of diseases and disorders Nature herself is busy all the time trying to get a cure; in these cases the quack has his opportunity and you may be sure he shares neither the profits nor the credit with Nature. Nature is also working for the physician, surgeon, and masseuse, and they, being conscious of that fact, try to discern not how far they cured the disease but how far the measures they have taken or the movements they have applied have really assisted Nature in securing a restoration to health. If you look at your daily work in this way every case becomes of interest to you. You must ask yourself—and only experience can teach you this—"if I do nothing to this case what will happen—how many days will Nature take to effect a cure; if I aid her in this way or in that by how many days shall I shorten her labour?" All the time you must remember that there is in your patient's body a mechanism of recovery, and whatever action you take or make must be such as helps that mechanism. The key to the art of healing is a knowledge of the reparative mechanisms of the body. That is why you must know the anatomy and physiology of every part, for how can you hope to restore action to muscles and joints unless you know how these act in health?

Rational Basis of Healing.

If in any way I were to undermine your confidence, if I were, in ever so slight a degree, to make you sceptical of the treatment you apply, I should do you an ill-service. Of the exact manner in which the patient's brain and his central nervous system can influence the tissues of his body and the healing power which is inherent in these tissues, we are largely ignorant at present. But we do know that it is an influence which can work on the reparative powers of the tissues—an influence which can work for good or for ill. We are all aware of that. Quacks ply their trade, trusting by a show of confidence to call that power into operation in their own favour. Christian Scientists, with more faith than knowledge, also rely on it and use it. With a backing from the natural powers of the flesh to heal, and the response with which the nervous system reacts to an implicit confidence, a faith-healer may pursue his or her way for a period with some appearance of success. But even in the short run Nature shows up their ignorance and the grossness of their pretence. It is otherwise with those who found the practice of their art on a rational basis. If you know how the movements you apply to your patients, be they passive or active, friction or stroking, effleurage or petrissage, are assisting the natural powers of the body to effect a cure, then you bring to bear on your patient not only the confidence of the faith-healer and the audacity of the quack, but the continued assurance which only rational knowledge can beget in a healer. You have, then, nothing to hide, nothing to explain away, and nothing to fear; all is as fair as the face of truth itself. The one condition is that there must be knowledge—knowledge of the powers of reparation inherent in bodies of man and beast alike.

EGYPTIAN VITAL STATISTICS, 1918.[1]

EGYPT had a population estimated (on the basis of the 1917 Census) at 12,907,870 on July 1st, 1918, as compared with 12,760,229 in 1917. The birth-rate for the whole country was 39·0 per 1000, as compared with 40·3 in the previous year, and the death-rate was 39·7, compared with 29·5. The chief cities, Cairo and Alexandria, the Suez Canal (including Port Said and Ismailia), Damietta and Suez, form so many Governorates, this term being also applied to the sparsely populated Eastern and Western Deserts, the Oases, and the province or district of Sinai. The rest of the country is divided into Mudiriyehs (or provinces), of which there are six in Lower and eight in Upper Egypt. The birth-rate for the whole country was, as just mentioned, 39·0 per 1000. In Cairo, with a population of 763,320, the ratio was 36·7, compared with 41·3 in 1917; and in Alexandria, with 447,441 inhabitants, 36·5, compared with 40·2 in 1917. But in each of these large cities there was considerable variation, the Cairo births ranging from 27·0 per 1000 in the Esbekiya district and 29·1 in Helwân to 44·8 in Bulaq and 46·3 in Old Cairo; the proportion of births being, of course, in inverse ratio with the pecuniary prosperity (or social position) of the residents. Similarly, in Alexandria, the birth-rate varied between 24·7 in El Attarin and 43·7 in Mina al Basal. The town of Ismailia, situated on Lake Timsah, halfway between Port Said and Suez, with a population of 11,408, had the extraordinary birth-rate of 104·1 per 1000, an increase on that for 1917, which was 83·6. The death-rate was even more extraordinary, 738·6 per 1000 (compared with 130·4 in 1917): 7932 out of the total 8426 deaths were males. No explanation is given of this extreme fertility and fatality: presumably there was a large floating population in addition to those enumerated or estimated. For Egypt as a whole the death-rate was 39·7 per 1000, an immense increase on the ratio for 1917, which had been 29·5

[1] Annual Return of Births, Deaths, and Infectious Diseases registered in Egypt during the Year 1918. Cairo: Government Press. 1920.

in the Mudiriyehs, or provincial Egypt, the ratios varied between 25·7 in Aswân and 41·9 in El Qalyubiya and in El Faiyum. In the Governorates, Cairo had a death-rate of 50·4 (compared with 35·8 in 1917), Alexandria had 43·3 (compared with 31·8), the Oases 80·8 (compared with 41·0), the province of Sinai 782·2 (compared with 56·3). Ismailia has been already referred to. Of the total death-rate (51·01 per 1000), more than one-third is due to three diseases. Gastro-enteritis of children caused 19,201 deaths, equivalent to 10·08 per 1000 (of the whole population); this prevailed throughout the year, was worst in June, July, and August (7517 deaths), and comparatively slight in January, February, and March (1585 deaths). Bronchitis, acute or chronic, caused 10,051 deaths (5·28 per 1000), of which 3454 occurred in November and December. Pneumonia and pleurisy caused 6256 deaths (3·21 per 1000), of which 3265 occurred in November and December. Probably deficient or unsuitable clothing was largely responsible for the prevalence in each of these three diseases. Happily there were only 23 deaths from hydrophobia; these were distributed throughout the year, except that there were no deaths in October and December; 12 occurred in July, August, and September.

THE ROYAL SURGICAL AID SOCIETY.

THIS Society, which was established in 1862, has done a large amount of good work in supplying poor persons with surgical appliances, thus rendering them more efficient members of the community, and in many cases helping the bread-winner to keep the family from being a burden on the State. It is now making an appeal for much-needed funds. To assist in this appeal a collecting-box in the form of a builder's brick, a specimen of which has been sent to us, is being sent out, and an attractive poster in connexion with it carries the message: "Be a brick and help build up the deformed, stricken, and maimed." The idea is an excellent one, for it forcibly reminds the giver that by subscribing to the Society, which is entirely undenominational, he is helping to reconstruct damaged elements of the industrial structure. The work of the Society is truly national and begins where that of the hospital leaves off. Some 500 appliances are supplied weekly. The appeal offices are at 26, Great Ormond-street, W.C. 1, and the headquarters at Salisbury-square, E.C.

A FOOT ARCH SUPPORT.

WE have received from Messrs. Salmon Ody, Ltd., of New Oxford-street, London, W.C., an ingeniously constructed "arch support" for use in flat-foot and other cases where the instep requires support. Beneath a leather sock, shaped to the under part of the foot, is affixed a small mattress-like series of springs, the tension on which is modified according to need by turning a small screw-threaded rod. The apparatus is light and resilient in use.

CHILDREN'S COUNTRY HOLIDAYS FUND.

To the Editor of THE LANCET.

SIR,—It has been the practice of the Chairman of the London County Council at this period of the year to issue an appeal on behalf of the Children's Country Holidays Fund. For many years, by means of this Fund, a large number of the children attending the London elementary schools have been enabled to obtain a fortnight's holiday in the country, which has proved of substantial advantage to them from every point of view. This year the Fund has to face a considerable additional expenditure owing to the rise in prices. The charge for a child's board in the country has increased from 9*s.* to 12*s.* a week, whilst, owing to the difficulty of finding sufficient accommodation as a result of the housing problem, a few camps for elder boys are being organised, which will entail further expenditure. At the same time, unfortunately, subscriptions are considerably lower than last year.

May I appeal to all those who are shortly taking a holiday to remember the excellent work of this Fund in order that no children may fail to secure their holiday. Donations should be made payable to the Children's Country Holidays Fund, and should be sent direct to the Secretary at No. 18, Buckingham-street, W.C. 2.

I am, Sir, yours faithfully,
JOHN W. GILBERT,
July 30th, 1920. Chairman of the London County Council.

NECESSITOUS LADIES' HOLIDAY AND GENERAL FUND.

To the Editor of THE LANCET.

SIR,—In your kindness you have allowed me to appeal for years past for contributions towards the Necessitous Ladies' Holiday and General Fund, and I venture once again to ask the charity of your readers; for whose generosity in the past I could never be grateful enough. The poor ladies, unlike their sisters of the rougher classes, are suffering pitifully through the difficulty of obtaining work. I refer to superannuated hospital nurses, governesses, literary ladies, musicians, painters, actresses and companions, many of whom, disqualified by age or infirmity to get engagements, are left behind in the city in the summer months exposed to the privations attendant on poverty.

The Fund also supplies food, medicine, and clothing, and comforts that are even more urgently needed than rest or change of air. Faced with the high cost of living on their tiny incomes, many are in daily anxiety.

I plead, then, for the old, the sick, and helpless. All contributions sent to the following address will be gratefully acknowledged and distributed.

I am, Sir, yours faithfully,
CONSTANCE BEERBOHM (Miss),
48, Upper Berkeley-street, London, W. 1, Treasurer.
August 3rd, 1920.

CHALYBEATE PUNCH: A QUAINT NORFOLK CUSTOM.

CHALYBEATE waters are unlikely ingredients for a bowl of punch, yet this is one of the principal features of a banquet recently revived by a West Norfolk Society known as the "Sons of Reffley." Reffley spring is about two miles from King's Lynn, in the midst of charming woodlands, and from it flows a chalybeate water reputed to possess medicinal qualities. It is strongly impregnated with iron, is of the consistency of ink, and in its raw state is not very pleasing to the taste. The society known as the "Sons of Reffley" is 200 years old, and at present contains about 30 members, who are called Knights of the Temple, their rites being performed in a quaint little temple close to the spring. At the annual banquet of the members, recently held for the first time since the war, the toasts were drunk in the famous "Reffley punch," a wonderful concoction of spirits and the chalybeate waters from this spring. This punch is prepared from an ancient recipe, the secret of which is known only to the successive presidents of the society, and the brew is prepared by the acting president in the morning before the members appear on the scene, and is imbibed from several quaint vessels of considerable intrinsic value belonging to the society. Each newly elected member has to drink a full mug of liquid from the spring, after which he is presented with a long churchwarden pipe. The present President of the "Sons of Reffley" is Sir Everard ffolkes, on whose property the spring is situated.

AN INDIAN MEMORIAL AT BRIGHTON.

THE Brighton Town Council on July 29th accepted the offer, made through Sir James R. Dunlop Smith, of a permanent memorial to commemorate the use of the Royal Pavilion as a hospital for Indian troops. It will take the form of a gateway at the southern entrance to the Pavilion, designed by Mr. Thomas Tyrwhitt, and intended to harmonise with the Oriental character of the buildings on the Pavilion estate. The money is provided by a number of Indian princes and gentlemen in recognition of the generous hospitality and attentions shown to their wounded compatriots by the people of Brighton. Sir Walter Lawrence, Sir John Otter, and Sir J. R. D. Smith were appointed, in conjunction with a local committee in Brighton, to decide on the form which the memorial should take.

PUFFS FROM PATIENTS.

LETTERS of thanks, real or fictitious, are part of the recognised outfit of the vendor of patent medicines. The regular practitioner of medicine has long ceased to make use of them in this country. In South Africa the practice seems still to persist. The following letter appeared in a recent issue of the *Natal Witness*:

SIR,—I am instructed by this branch of the British Medical Association to invite your attention to the fact that notices frequently appear in your valuable paper in which medical practitioners are thanked for services which they have rendered to patients. The Association desires that it should be known that the occurrence of the names of medical practitioners in such notices is not approved by it, and feels assured, when this is publicly known, that the practice will cease.

I am, Sir, yours faithfully,
(Signed) ALEXANDER EDINGTON,
Maritzburg. Hon. Secretary.

To this letter an editorial foot-note was added:—

We insert the above with pleasure. The Medical Association recognises, of course, that it is not possible for the press to actually refuse acceptance of such notices, but we have before endeavoured, at the request of the Association, to discourage a practice which is offensive to the majority of medical men.

Veritas.—As our correspondent continues to withhold his name and address we cannot reply to his questions, some of which merit attention. Incidentally he seems to mistake the scope of a medical journal, and to be entirely ignorant of the functions of the General Medical Council, where his previous anonymous communication was submitted.